

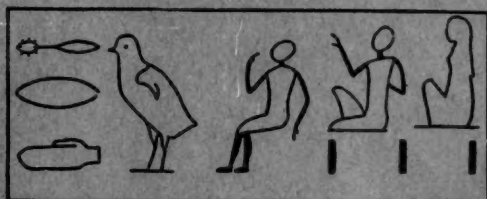
Vol. 7

THIS NUMBER COMPLETES VOLUME 7

DECEMBER, 1936

No. 4

CHILD DEVELOPMENT



Editorial Board

E. V. McCOLLUM

*Professor of Biochemistry, School of
Hygiene and Public Health, The
Johns Hopkins University.*

T. WINGATE TODD

*Professor of Anatomy, Western Reserve
University Medical School.*

HAROLD E. JONES

*Director, Institute of Child Welfare,
and Professor of Psychology,
University of California.*

FREDERICK F. TISDALL

*Director, Research Laboratories, Department
of Pediatrics, University of Toronto, and
Attending Physician, Hospital for
Sick Children, Toronto.*

MANDEL SHERMAN

*The University of Chicago,
Chicago, Illinois.*

F. STUART CHAPIN

*Professor and Chairman of Sociology and
Director Graduate Social Work,
University of Minnesota.*

BUFORD JOHNSON, Chairman

*Director of the Child Institute of the Psychological Laboratory, and Professor of
Psychology, The Johns Hopkins University.*

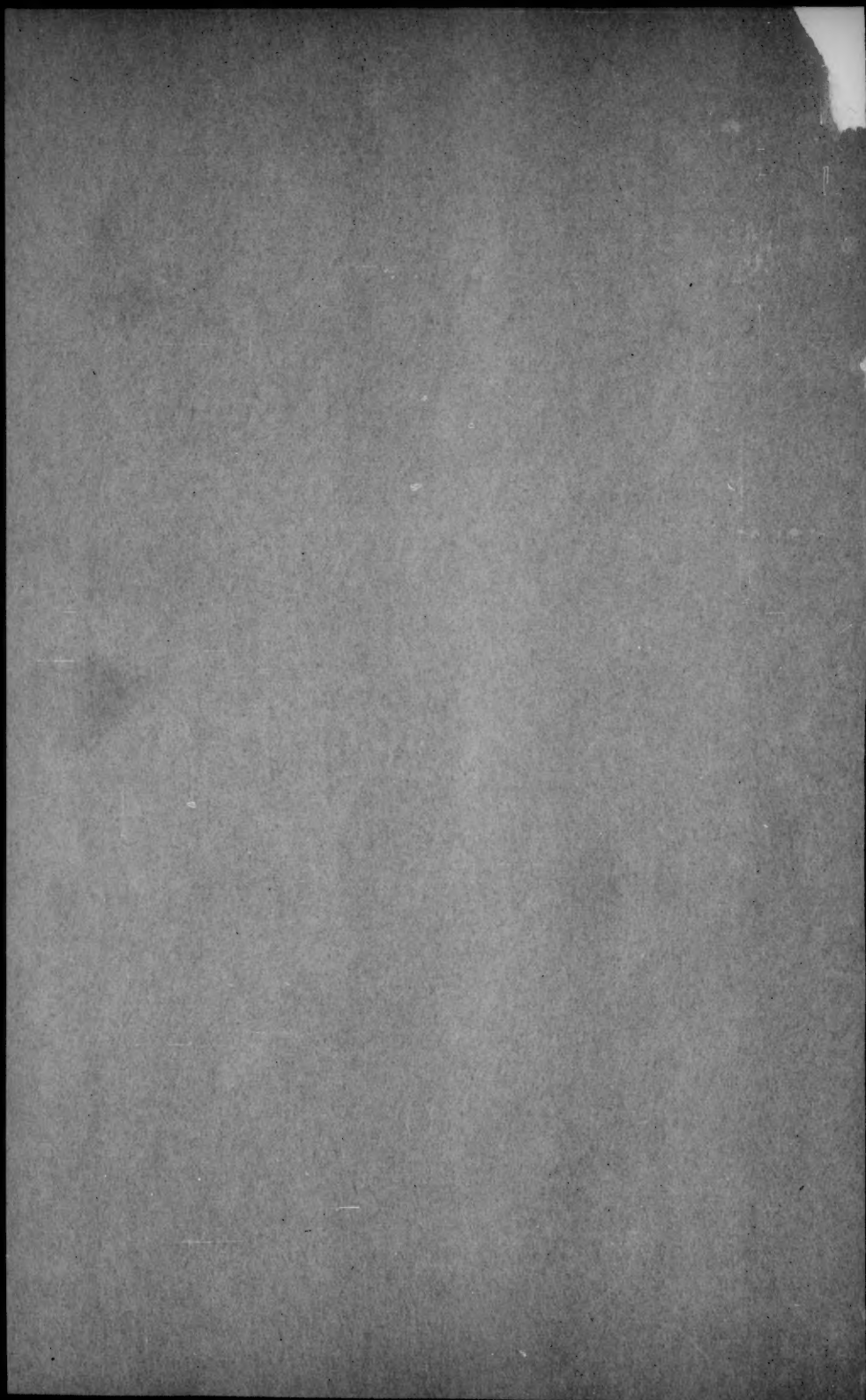
PUBLISHED QUARTERLY BY THE SOCIETY FOR RESEARCH IN CHILD DEVELOPMENT

NATIONAL RESEARCH COUNCIL

2101 CONSTITUTION AVENUE

WASHINGTON, D. C.

Made in United States of America



THE METHOD OF ADMINISTRATION OF THE RORSCHACH INK-BLOT TEST

MARGUERITE R. HERTZ¹

Various claims have been made for the Rorschach Ink-blot Test in the fields of psychology and psychiatry. For a review of the work done with the Rorschach method up to January, 1934, reference should be made to Vernon (31, 34) or to Hertz (7). The method is valuable for the diagnosis of intelligence, types of intelligence, aptitudes and talents, and vocational fitness. Personality studies may be made of different groups of children and adults. Racial differences may be detected, the influence of heredity and environment on personality disclosed. The test is effective as a clinical diagnostic instrument. Characteristic differences in terms of the Rorschach factors may be established among various personality and behavior types. The different mental disorders may likewise be diagnosed. Finally, the test may serve as a valuable supplementary technique to the psychoanalytic method.

Despite this extensive work, however, the test suffers from serious limitations. As has already been pointed out (7), the administration of the test has not been standardized. The scoring is highly subjective and indefinite. Norms are still inadequate for different age-groups and those which have been published have been amassed by different methods of administering the test and by the employment of a variety of criteria and of scoring methods.

It is obvious that the reliability and the validity of the test depend in part upon the standardization of the method of administration. Gross variations may appear in two Rorschach psychograms of the same individual, depending upon variations in the manner of giving and of scoring the test. The objectivity of the scoring itself depends in a measure upon adequate standardization of the administration. Variations in instructions, in the manner of presenting the blots, in the accompanying conversation and suggestions, in the attitude of the examiner, in the approach of the subject, and in the length of time allotted, -- all affect the reliability of the scores and the resultant psychogram.

An examination of the work which has been done with the Rorschach method shows that the test has not been standardized to the point where all examiners apply the method in the same way. Unfortunately no guide or manual has yet been produced. The original Rorschach publication (27) has been re-edited (29) but is still inadequate to give the student satisfactory comprehension of either the technique of administration or the proper evaluation of the test factors. Reference should be made to the articles by Deck (1-3), Vernon (31), Loosli-Usteri (15), L  pfe (17), Oeser (24), Kerr (11), Monnier (22) and Guiridham (5), for descriptions of the administration and scoring in more or less detail.

Many investigators believe that the test is easy to administer. Mac Calman (18), for example, says in reporting on the test, "The administration of the test is simple in the extreme". Practice with the method, however, impresses one with

¹ From the Brush Foundation, Western Reserve University.

the innumerable difficulties involved in recording the responses accurately and in locating the details or combination of details which have been selected for interpretation.

Most examiners try to administer the test in accordance with the directions set forth in the manual (27, 29) and in the subsequent article which was published by Oberholzer after the death of Rorschach (28, 29). While the procedure is generally outlined and many suggestions and examples are included in order to guide the examiner, there is still much variability in the way the test is given by different administrators.

Some examiners sit opposite the subject, others beside him. Vernon (31) places the subject in front of him a little to the side so that he may have the view of the card as it is being examined by the subject. Beck (3) makes sure there is no table or other furniture before the subject, thus precluding setting the card down.

Most examiners like Beck (1-3), Loosli-Usteri (15), and Mandowsky (19) use Rorschach's instructions "What could this be?" or "What do you see?". Others like Juarros and Soriano (10) and Vernon (31) change the instructions slightly, thus: "Will you tell me if this suggests anything to you?". Salas (30) asks his subjects what they see or what they think the pictures represent. Line and Griffin (14) simply ask what the picture might be, what it suggests, adhering to what they call "the standard procedure". Powell (26) says "Tell me everything you see in this."

Oeser (24) gives more elaborate instructions: "You will be given a number of blots to interpret in any way you choose and in your own time. The blots don't mean anything in themselves but it is possible to see almost anything in them, just as you can see faces and figures in the fire or in clouds. I am going to note the average time, so don't uncover a blot until I say 'now'". The subject is then given the cards and told he can take as long as he likes and say what he likes. The wisdom of suggesting a particular kind of response even if only given as an example to explain the nature of the test, is to be questioned. It would seem that such suggestive words as "fire", "clouds" and "faces" might set up definite trains of thought and might serve as a control throughout the test. As a matter of fact, Rorschach (29) has shown how control of this nature when deliberately initiated, influences the scores, eliciting pictures different in many respects from those which are obtained when no suggestions are made.

Some examiners modify their instructions to suit the particular age-group in which they are interested. Kerr (11) adapts the instructions used by Oeser, thus: "Someone has made some blots of ink on these cards. I want you to tell me what you think they look like. You know the way people sometimes see faces in the fire, well I want you to tell me what you see in these blots." The same criticism may be applied to these instructions as to those of Oeser. Beck (3) specifically cautions against saying anything which in any way suggests a certain kind of response.

Cards are generally presented by the examiners, one at a time, the correct

side uppermost, some examiners handing the cards to the subjects, others permitting the subjects to help themselves. Rorschach is generally followed in the instruction to the subject to hold each card at any distance "within arm's length", but not from a greater distance. Rorschach also indicates that the subject may turn the card at will, looking at it from different sides, upright, upside down, or sideways. Some examiners tell their subjects to turn the card, reminding them when they fail to do so. Others suggest to the subject that "he may see more objects in the card if he turns it". Still others are silent on the matter of viewing the card from different angles, leaving it to the subject to do as he will. Mac Calman (18) instructs, "If the patient asks, - and only if he asks - he can be told that the card may be turned at will".

Similarly, the matter of speed of associations and that of number of responses are treated in different ways by different examiners. Some encourage the subject to "give at least one answer each way", others "to answer as quickly as possible", others "to give at least one answer each way", and still others reduce their comments to a minimum. Beck (3) encourages the subject to the extent of saying "most people see something" or "most people see more than one thing". Rorschach permitted urging to the point of getting at least one response for each card.

Rorschach found it impractical to limit time of exposure for each blot. He permitted unlimited time. He estimated that for normal subjects, the total time for the entire test should be from twenty to thirty minutes. Many examiners like Beck (1-3) Levy (12), Oeser (24), Vernon (31) and Mandowsky (19) follow Rorschach's procedure in giving unlimited time, generally recording the total time for each card. Oeser's subjects averaged about 45 minutes. None of his subjects took as little as 20 minutes and twenty-four of them took over 30 minutes. Vernon's adult subjects took between 30 minutes and 2½ hours. Harriman (6) reported that his subjects took from 35 minutes to 2½ hours likewise. Some of Powell's subjects (26) took less than 2 minutes per card, others as long as 20 minutes to a card.

Löfpe (17) limited his subjects to 7 responses for each blot. Line and Griffin (14), testing healthy adults and mental hospital patients, placed a time limit of 5 minutes per picture on the healthy subjects, no time being imposed on the others. The subjects were not warned of this, however, but were simply handed another card at the expiration of the allotted time. The authors report that only in very few instances was the full 5 minute period utilized. Vernon (31) disproves of all such curtailment although in a subsequent article (32) in discussing this writer's work, he admits that it may be a legitimate procedure "when it is desired to treat the results of normal subjects statistically".

As with other tests, the attitude and the degree of cooperation of the subject are of utmost importance. Some examiners report that normal subjects display great interest in the test and put forth their best efforts as a general rule. Rorschach thought that children especially would find the test pleasant and easy. Some investigators, on the contrary, report difficulty with children. Pfister (25) for example, could not interest many of his low grade adults, many of them merely responding "I don't know". Juarros and Soriano (10) and Hira (20) likewise experienced difficulty with their mentally deficient subjects. On the other hand,

some subjects of Ganz and Loosli-Usteri (4) liked to do the test, taking it as a game. In another article, Loosli-Usteri (16) reports that her children could not appreciate the "meaninglessness" of the blots.

Oesser (24) reports that the symmetrical arrangement of the blots tends to be monotonous and affects certain types of subjects, such as his "color-reactors". Vernon (31) made similar observations.

Most examiners emphasize the importance of noting behavior while the examination is being given. They note attitudes, hesitation, distractions, chance remarks, comments on the test material, criticism of the responses, and the like. All these observations are extremely valuable in interpreting the test scores.

According to Rorschach's instructions, most examiners record everything the subject says, with the location of the details which have been selected for interpretation. Many examiners describe as accurately as they can, the position of the card and the location of the details. Many have adopted Loosli-Usteri's device (15) of the symbol "V" in its different positions (\wedge , \vee , $>$, $<$), the apex always referring to the top of the card to indicate how the subject held the card. Monnier (22) uses the arrow in similar fashion, to indicate the top of the card. Following Rorschach's suggestion, tracing sheets are frequently employed either by the examiner or by the subject himself when it is especially difficult to describe exactly what part of the blot elicits the response. Vernon (31) has recommended the use of prepared mimeographed diagrams on which the responses of the subject may be written in the appropriate places, each response being numbered. Space is then left along the sides or at the bottom for responses to the whole blot.

It is essential, in recording the responses, to get as much information as possible, not only as to what detail or combination of details was selected, but also as to what influenced the response, - form, movement, color, or shading, or a combination of these elements. Rorschach permitted cautious questioning of the subject after the test had been completed. This procedure is followed by most examiners. Becks (3) asks his questions indirectly so that his subjects will not know what elements are involved in the test. Vernon (31) on the other hand, thinks there is no harm in asking the subject directly what influenced his answers. Both caution against questioning the subjects while the test is in progress, thinking they might influence the responses to the later blots by suggesting in the course of the examination the specific factors that are scored.

Finally, most examiners try to keep the test situation as free and easy as possible. They try to avoid all restraint and formality. Conversation is encouraged; all questions are answered. There are some, however, who emphasize a minimum of conversation. Mac Calman (18) for example says "with the average patient, the examiner need say nothing with the exception of the first question, until the test is finished"

From the foregoing resume, it can be concluded that there is much variability in the administration of the Rorschach test. In order to reduce the amount of error and to make the administration as controlled and as objective as possible, the

test needs some degree of standardization. This involves 1) control of the conditions of the test so as to keep the reactions of the subject as uniform as possible, 2) the development of standard instructions which will elicit adequate responses and 3) the working out of a system of recording the responses which will give scores that will be comparable when the test has been given to the same individuals by different examiners.

Problem

Reference has already been made (7, 8, 9) to the research project conducted by the Brush Foundation.¹ As a result of preliminary work² with the test based on a "normal miscellaneous" group of 70 subjects, and "emotionally unstable group" of 30 patients and a "mentally disordered group" of 50 patients, it was deemed necessary to make certain modifications in the administration of the test prior to attacking the problems of reliability and validity. The ensuing report is an account of the procedure of administration as modified and standardized by the Brush Foundation and is the method which is used to date in the Rorschach examination.

Material

The standard series of ink-blots was mounted on stiff cardboard for durability. There was no visible change in their appearance. Additional equipment was prepared consisting of

- Personal Data Sheets
- Record Blanks
- Trial Blots
- Diagrams of the Ink-blot designs
- Tracing sheets
- Summary Sheets
- Stop-watch
- Pencils

1. Personal Data Sheet.

To insure systematic records, the Personal Data Sheet was prepared so that the name, date, age, and other information could be recorded in the appropriate places, to be filled out at the convenience of the examiner, from institutional and school records and from other divisions of the Brush Foundation. Figure 1 is a sample of the Personal Data Sheet used.

2. Record Blank.

After experimenting with several different kinds of blanks for recording the

¹ The Brush Foundation is the central partner in the program known as the Developmental Health Inquiry of the Associated Foundations.

² The preliminary work done with the Rorschach Method prior to the Brush project is described in detail in Hertz, M. R. Unpublished Thesis: The Rorschach Ink-blot Test. Western Reserve University Library, Cleveland, Ohio.

Serial No. _____

NAME _____ DATE _____ EXAMINER _____

AGE _____ DATE OF BIRTH _____ PLACE OF BIRTH _____

RACE _____ NATIONALITY _____ SEX _____

ADDRESS _____ MARRIED, SINGLE _____

SCHOOLING (indicate schools attended, and degrees, if any)

SCHOOL ATTENDING NOW _____ GRADE _____

Years attended school _____

OCCUPATION _____

NO. OF CHILDREN IN FAMILY _____

PARENTS _____

Father _____ Occupation _____

Mother _____ Occupation _____

Physical history _____

Social History _____

Social status; Very inferior, Inferior Average Superior

Very Superior

Educational Status: E. A. -- _____

Mental Status: M. A. _____ I. Q. _____

Personality Data _____

Figure 1. Personal Data Sheet.

Serial No.....

NAME	CA	DATE
R.T.	RESPONSE	SIGNA

Figure 2. Record Blank.

responses, the Record Blank shown in Figure 2 was adopted. Spaces were provided at the top for name, date and serial number. The remainder of the sheet was divided into three columns, a small column to the left for the Reaction Time (R.T.), a wide column for the "responses", and a third to the right for the "Signa" or scoring.

3. Trial Blot

It was observed in the preliminary experiment that the test scores were greatly influenced by the attitude of the subject toward the test, especially in the initial approach of the subject. Amusement at the novelty of the task, suspicion, shyness, fear, doubt, and superior attitudes all influenced the test results and in particular the responses to the first test card. In order to make the first card more comparable with the rest and to establish a favorable mental set at the beginning, it was decided to introduce a trial blot before passing to the regular series. Several blots were made of black ink on white paper and a few, very simple in design, were selected for use as trial blots. Only one trial blot was used for each subject. The trial blots differed, of course, from the others in that they were obviously "homemade", just ink on ordinary paper. This fact, however, seemed to aid the situation, since subjects readily understood what the blot designs were like and how they had been made. Figure 3 is a diagram of one of the trial blots used.

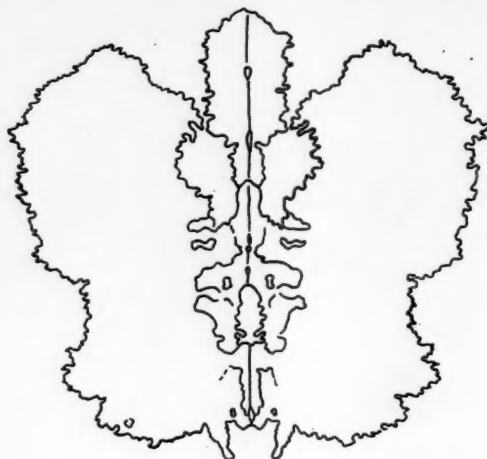


Figure 3. Trial Blot

It was felt that the introduction of the trial blot did not make any great change in the Rorschach method. As a matter of fact, Rorschach instructs that in the case of subjects who do not understand the nature of the test or who are suspicious, all necessary explanations should be made, even to the extent of demonstrating blots before them.

4. Diagrams

Diagrams of each blot which had been traced in ink, black and colored to correspond to the original designs, had proven so useful in the preliminary work, that they were retained and used.¹ The parts of the blots which subjects in the preliminary experiment had selected for interpretation had been assigned symbols, letters and numbers, which had been written on the diagrams. Figure 4 is a reproduction of the diagram for Card I, as prepared in the preliminary work and used in this project. It may be observed that the side figures of the blot are labelled "S", the whole middle portion "M", the "wings" at the sides "2", the tiny "claws", upper middle edge "1", and the space forms "6" and "7". These symbols had been assigned in the course of the preliminary work, as the details were selected, new numbers and additional letters being constantly inserted in the diagrams as subjects named new or different parts. It was found that within a short time, most of the usual details had been assigned symbols and it was not necessary to make further additions to the diagrams, except on rare occasions. It should be mentioned, also, that by the time that the Brush project was started,

¹ These diagrams are being reproduced in conjunction with the Frequency Tables which are being mimeographed by the Brush Foundation and which will be available.

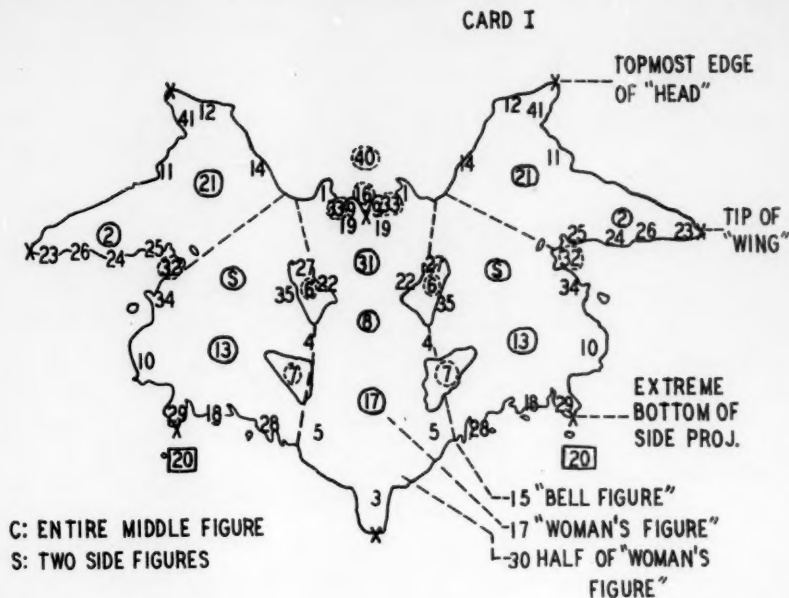


Figure 4.

the examiner knew most of the symbols and their respective location and it was unnecessary in the experiment proper to refer to the diagrams for all responses.

5. Tracing Sheets

Blank tracing sheets were also provided to be used in case it was extremely difficult to locate details by the use of the symbols. It was found in the preliminary work that the symbols and descriptive notes sufficed for the most part. Infrequently however, very unusual parts of the blots had been selected and tracing sheets were then put to use and filed with the record. Therefore tracing sheets were included in the equipment, cut into squares the size of the test card and arranged in a folder for use in case of necessity.

6. Summary Sheets

Figure 5 shows the Summary Sheet prepared to record Rorschach scores. Use of this record will be described in another paper, in the discussion on the standardization of the method of scoring.

Rorschach Psychogram

Serial Number.....

Group.....

Name.....

Date.....

Age.....

No. of Responses..... Items.....

R. T.....

No. of Failures.....

Mode of ResponseQuality of ResponseContent

W..... %.....

F.....

A..... %.....

dW..... %.....

F+.....

Ad..... %.....

D..... %.....

F-.....

%A.....

Dr..... %.....

%F+.....

Do..... %.....

M..... %.....

H..... %.....

DS..... %.....

Md..... %.....

Hd..... %.....

%Hd.....

Apper.Mode.....

C.....

Anat.... %.....

Succ.....

CF.....

FC.....

Obj..... %.....

Sum Color...

F(c).... %.....

Arch.... %.....

Color Shock.....

Bot...., %.....

Geog.... %.....

Geol.... %.....

Fire.... %.....

Mt..... %.....

St..... %.....

Sc..... %.....

Wr..... %.....

.....%.....

.....%.....

Intelligence

W.....

%F+.....

M.....

C.....

%A.....

%O+.....

Apper.Mode.....

P..... %.....

Succession.....

O..... %.....

Erlebnistypus

O+.....%.....

M : C

O-.....%.....

Personality Data.

Figure 5.- Scoring Sheet

Procedure

The material was placed in folders, all appropriately labelled, so arranged that one folder fitted into another, the whole making up one large folio of Rorschach material. Separate folders held the Personal Data Sheets, Record Blanks, Trail Blots, the standard series of ink-blots arranged upright I through X, Tracing Sheets, Diagrams I through X, and Summary Sheets.

The subject and the examiner were alone in the room, seated before a desk, the subject to the side and a little in front of the examiner, facing away from the desk. The examiner could look over the subject's shoulder and could watch him as he pointed to different parts of the blots. The cards, in appropriate order, face down, were on the desk, the trial blot on the top visible to the subject. The portfolio with the diagrams was within reach of the examiner, closed, for reference if necessary. No diagrams were visible to the subject. The examiner had record blanks before her, stop watch in her left hand ready to be started at the first response of the subject, pencil poised in the other hand, ready to record responses.

Uniform directions, prepared and memorized by the examiner, were given: "I am going to show you some cards, one by one. The cards have designs on them made up of ink-blots. I want you to take each card in your hand, look at it carefully and tell me what you think it could be, what it looks like to you. You may hold the card any way you wish, but be sure to tell me everything that you see in the design. When you have finished with a card, you may give it to me and I'll give you the next card." If you do not understand, ask me any further questions....

"For example, look at this card and tell me what you think it could be. What does it look like to you?Anything else?Does it look like anything else?"

While these directions were given, the examiner showed the Trial Blot and turned it on all sides to indicate it may be viewed from all angles. She showed that the card must be held within the arm's length.

When the subject gave answers, he was encouraged by such remarks as "Yes, it does look like that", or "That's what I said, too", "So many people say that", or "Why that's an interesting answer".

For cautious or recalcitrant subjects, the examiner added: "You know these are only ink-blots. You simply put a drop of ink on a piece of paper, fold it, press the sides together and you get one of these forms or designs. These blots look like different things to different people. We want to know what they look like to you. Now what do you think this can be?"

If the subject hesitated still, the examiner said: "There is no right or wrong to any answer to these blots. They are just ink-blots. All I want you to tell me is what they look like to you, what do they make you think of."

Questions of the subject were answered to the best ability of the examiner.

At no time, of course, was any suggestion given that would indicate to the subject that the whole blot was to be interpreted or certain details selected or that some special kind of answer was to be preferred. After the subject gave all the responses he could to the Trial Blot and when it was certain that he understood the nature of the task, the test proper was begun. If full cooperation was not obtained, the examination was not attempted.

Taking the Trial Blot away, the examiner said: "You have the idea, now. Tell me what you think this could be? What does this look like to you?" The examiner presented Card I, starting the stop watch with her left hand. The reaction time was noted in the first column, from the time the card was made visible until the first response was given.

In the preliminary work, the reaction time for each card was recorded from the time it was exposed until it was returned. The results showed variations not only among various individuals but also in the same individual for the different test cards. One card elicited numerous responses while another card brought forth only a few. One card was returned in a short time while another was kept for several minutes. Response data were therefore divided most unevenly.

It was further observed that two minutes generally sufficed for reactions to each card. Therefore in order to standardize conditions of the test, it was decided to limit the time to two minutes per picture, allowing twenty minutes for the entire test proper, not including time for instructions, explanations and discussion. The time limits adopted agree with Rorschach's estimate that for normal subjects, the test should take between 20 and 30 minutes.

Since Rorschach considered color-shock significant, i.e. the phenomenon evidenced by a longer pause between the colored ink-blot and the response, it was decided to record the speed of the first reaction. The stop-watch was therefore started the instant the card was presented to the subject and the time recorded when the first response (not the first remark or exclamation) came. The subject was permitted to give answers until two minutes had elapsed. The responses were taken down verbatim, with notes pertaining to attitudes, gestures, comments, mannerisms, certainty or hesitancy and the like. Such behavior notes were taken throughout the course of the test.

Symbols were used to indicate the position of the card (the "V") and the location of the parts of the blot which were selected for interpretation. The diagrams were referred to, when necessary. At times, tracings were made and attached to the record.

Care was taken not to exercise pressure or compulsion. Every attempt was made to secure maximum cooperation of the subject, even to making ink-blot designs. Free conversation was permitted before and during the test. If the Subject was curious, the examiner did not hesitate to discuss the test, avoiding of course all suggestions which would stimulate a definite mental set toward the subsequent pictures.

After two minutes had elapsed, the examiner asked questions indirectly and

cautiously about those responses about which she was doubtful, in an effort to elicit information concerning mode of response, - whole or details and which details, - and the factors which had influenced the interpretations, - form, movement, color or shading. Care was taken to avoid any suggestion that a special kind of answer or a particular detail bore more weight than others. Questions of the following nature were asked, for example:

Card I. "a mask". Question: "What made you say this was a mask?" "Will you explain it to me more fully?" Then the subject generally explained that the spaces made him think of "eyes, nose, and mouth".

Card I. "two angels revolving around a pole". "What made you say that? Will you show me where you see those angels? and the pole?"

Card I. "an acrobat act". "Why do you say that? That's an interesting answer". The subject pointed out "an acrobat is on one side, another man on the other, holding a third in the middle; they are balancing themselves" (shows the movement).

It cannot be overemphasized that the examiner must get as much help as possible from the subject at the time of the examination in order to render the scoring as accurate and reliable as possible. Despite the fact that many examiners object to asking questions after each card, it was found more effective to ask some "safe" questions than to wait until the end of the test for all questions. Frequently between 25 and 50 responses were given by subjects. It was observed in the preliminary work that many of the subjects forgot where certain answers had been located or what had originally motivated their interpretations, when questions were delayed until the end of the test. The result was that many of the answers were doubtful and could not be scored accurately. It was therefore decided to discuss answers at least in part after each card where necessary. Extreme care was taken not to suggest the classifications or categories that are scored. It was felt that no harm was done in making some cautious inquiries after the two minute period had elapsed and a greater measure of accuracy was attained. All further questions were delayed until the end of the test, the examiner indicating by means of a check placed in the margin that further questioning was necessary.

After all discussion had been finished, Card I was placed face down and Card II presented, stop-watch started and the same procedure followed as for Card I.

Card II introduces color. As suggested above, cautious questions were asked after the time limit to get explanations for some of the doubtful answers in reference to pure color, color-form, form-color, form, movement or shading. Card II, was interpreted, for example, on many occasions as "two clowns". The subject was asked, "Why do these look like clowns to you?". Some subjects referred to the red thus: "It looks like red caps on two men so that the men are all dressed up like clowns". This would indicate the influence of color and make the answer a

form-color answer. Many more subjects explained this answer in terms of movement. "The figures look like two men jumping up and down like this, clapping their hands together, or doing tricks".

Again, Card II was interpreted when inverted as "a sunset going down over the mountain". "Why?". "Because this red here is the color of fire and the rays are coming out like the rays of the sun. It seems to be over a mountain and here's the reflection below".

Card II was frequently interpreted as "a volcano". "What gives you the impression of a volcano" was asked. Some subjects emphasized the "red exploding" showing the color; others mentioned the "hole in the center of the mountain" pointing out the space detail.

This procedure was followed for all ten cards. After the cards were completed, the examiner returned to the doubtful answers and asked further questions. For example, for Card II, the answer "butterfly" was given for the whole blot. "Would this look like butterfly to you if it were all black?" was asked, in order to determine the relative influence of the form and the color. Every effort was made to get the assistance of the subject while the subject was available. All answers and remarks were, of course, carefully taken down. Figure 6 is a reproduction of a part of a Rorschach record with all the details and explanations noted.

Reliability of the method of administration.

Report has already been made of the application of the Rorschach method in this form to a group of 300 students of Patrick Henry Junior High School, Cleveland, Ohio, ages ranging from 12 years 6 months to 16 years 5 months (9). Report has likewise been made of the reliability of the Rorschach factors as modified by the Brush Foundation (8). On the basis of 100 records selected at random from the group of 300, reliability coefficients for most of the test factors computed by the corrected split-half method were considered highly satisfactory. When these were compared with the indices of reliability in the preliminary experiment where some general factors were considered, it was observed that the reliability of the test has been considerably increased. The standardization of the method of administration, especially the limitation of the time of exposure, was thought to account in part for the better results obtained.

Subsequent modification of the Rorschach method of administration

The Rorschach method of administration has been further modified at the Brush Foundation, in two respects. First, mimeographed copies of the ink-blot are utilized, as originally suggested by Vernon (31). These are used, however, only in place of the blank tracing sheets when there is doubt as to the location of the response. Mimeographed copies of the blots are placed in folders with their appropriate diagrams, ready for use when necessary. When an answer cannot be located easily by means of the symbols on the diagrams, the mimeographed sheets are used. Answers are written down on the record blanks with the rest of the answers, a star is placed next to them which indicates that there is a mimeographed sheet attached to the record. On this sheet are the necessary explanations. Of course,

Name... Jane Doe CA... 10 Serial Number... 6208
Date... Jan. 3, 1931

	R.T.	Responses	Scoring Signs
I.	20"	(timid, cautious, looks around, hesitates) well it might ^ be, no, well I guess it is a bat (W), see those wings (2), yes it's a bat; the wings are outspread.// ^ or it could be a bird too (W)// ✓ holding it this way, it might be a Chinese Temple, because it has a kind of tower (3) and funny kind of windows (6, 7) // ^ this is sort of a bell here (15) I just can't see anything else, really (gives up in 1'30")	
II.	10"	^ well, I guess this is two dogs holding something up (W) that's quite plain (puts fingers in mouth, fidgets) // ✓ ^ a butterfly with wings (W) // ✓ ^ a mountain scene, the sun setting, and I guess this is the reflection below (W esp. 3, 4). Funny how if you look, you can see something, isn't it? // can I say just about this part? Well if you hold it ✓ this way, it looks like a king's head (7) // (gives up - 1'55") (in answer to questioning) ^ it's a butterfly because I see these wings here, don't you see them? and the color (3, 4) is so pretty, too? ✓ the sun is setting here, see how those rays come out and see how the red is reflected below. I think it is a real pretty scene.	
III.	33"	^ well, first I see a butterfly (5), these are wings and here's a middle, I'm sure it's a butterfly // ^ oh, here's two men, funny men, bending over a pot cooking something I guess (W) // ✓ ^ up here are two parrots on sticks (4) > these could be fish (2) ✓ ^ this could be a negro-head That's all (2') (in answer to questions) If this butterfly were all like this (points to the black) it would still be a butterfly. It looks more like a butterfly because it is in red, though. These parrots are perched on sticks. It's plain, can't you see them up there; they are red and the stick is red. I guess it would have been better if there had been more colors	

Figure 6.- Rorschach Record Blank

as many mimeographed diagrams may be used as are necessary. Frequently none are called into service.

This method of combining the use of the symbols and the mimeographed diagrams appears to be the most effective technique that has been used at the Brush Foundation to date. Report will be made in another paper on the statistical reliability of the method of administration as developed.

In addition, unlimited time is now permitted the subjects, the two minute period being indicated and also the total reaction time for each card.

Conclusion

A review of the investigations made with the Rorschach ink-blot test emphasizes the deplorable lack of uniformity in the administration of the test. There is little doubt that if individuals were examined simultaneously by different Rorschach examiners using their respective and individual methods, the resulting records would contain many discrepancies. The scoring and interpretation would likewise be inconsistent in many respects. Further the norms amassed by different examiners could not be compared for research purposes or applied practically in clinical procedure because of the diversity of methods used.

It would seem most urgent for Rorschach examiners to concentrate on this phase of their problem and to determine upon a uniform method of giving the test. Recently the writer was requested to cooperate with several other Rorschach examiners in this country and abroad, in a joint project of scoring the same records in order to test the accuracy of the scoring method. It was impossible to score the records sent to her because many of the answers had been recorded without sufficient information concerning the location of details and the factors influencing the responses. Later, other records were furnished with accompanying tracings to assist in locating some of the answers. In many instances, even these tracings were inadequate and the writer had to indicate that many of her scores were doubtful.

Such a project is highly worthwhile. It is obvious, however, that the method of giving the test and of recording the responses must be standardized to some degree before such a project should be undertaken.

The procedure worked out at the Brush Foundation as outlined above seems to be satisfactory and offers promising results. It is presented here tentatively in the hope that it will stimulate cooperative action and lead to a refinement of at least the method of giving the test. There can be no doubt that the future of the Rorschach technique depends in large part upon the development of a standardized method which will be used universally by all Rorschach examiners and which will give strictly comparable results.

REFERENCES

- (1) Beck, S. J.: Personality diagnosis by means of the Rorschach test. *Am. J. Orthopsychiat.*, 1930, 1, 81-88.

- (2) Beck, S. J.: The Rorschach test and personality diagnosis. *Am. J. Psychiat.*, 1930, 10, 19-52. Also in *Institute for Child Guidance Studies* (L. G. Lowrey, Ed.) pp. 222-261. New York: Commonwealth Fund, 1931.
- (3) Beck, S. J.: The Rorschach test as applied to a feeble-minded group. *Arch. of Psychol.* 1932, 21, no. 136, pp. 84.
- (4) Ganz, E. et Loosli-Usteri, M.: Le test de Rorschach appliqué à 43 garçons anormaux. *Arch. Psychol.*, Genève, 1934, 24, 245-255.
- (5) Guirdham, A.: The value of the Rorschach test. *J. Ment. Sci.*, 1935, 81, 848-869.
- (6) Harriman, P. L.: The Rorschach test applied to a group of college students. *Am. J. Orthopsychiat.*, 1935, 5, 116-120.
- (7) Hertz, M. R.: The Rorschach ink-blot test: historical summary. *Psychol. Bull.*, 1935, 32, 33-66.
- (8) Hertz, M. R.: The reliability of the Rorschach ink-blot test. *J. Appl. Psychol.* 1934, 18, 461-477.
- (9) Hertz, M. R.: Rorschach norms for an adolescent age group. *Child Development*, 1935, 6, 59 - 76.
- (10) Juarros, C. and Soriano, M.: Le Psychodiagnostic de Rorschach chez les enfants anormaux. *Comptes Rendus de la IV Conf. Int. de Psychotechn.*, pp. 595-605. Paris: Alcan, 1929. Also in Spanish: *Siglo méd.* 1927, 80, 413-417.
- (11) Kerr, M.: The Rorschach test applied to children. *Brit. J. Psychol.* 1934, 25, 170-185.
- (12) Levy, D. M. and Beck, S. J.: The Rorschach test in manic-depressive psychosis. *Manic-Depressive Psychosis* (W. A. White et al.), pp. 167-181. (Proc. XI Meeting, Assoc. Res. Nerv. and Ment. Dis. 1930) Baltimore: Williams and Wilkins, 1931.
- (13) Linares Maza, A.: Investigaciones con el psicodiagnostico de Rorschach en niños normales españoles. *Arch. de Neurobiol.* 1932, 12, 693-738.
- (14) Line, W. and Griffin, J. D. M.: Some results obtained with the Rorschach test, objectively scored. *Am. J. Psychiat.*, 1935, 92, 109-114.
- (15) Loosli-Usteri, M.: Le test de Rorschach appliqué à différents groupes d'enfants de 10 - 13 ans. *Arch. de Psychol.*, 1929, 22, 51-106.
- (16) Loosli-Usteri, M.: La conscience du hasard chez l'enfant. *Arch. de Psychol.*, 1931, 23, 45 - 66.
- (17) Löpfe, A.: Über Rorschachsche Formdeutversuche mit 10 - 13 jährigen Knaben. *Ztschr. f. angew. Psychol.*, 1925, 26, 202 - 253.
- (18) Mac Calman, D. R.: The Rorschach test and its clinical application. *J. Ment. Sci.* 1933, 79, No. 325, 419 - 423.
- (19) Mandowsky, C.: Über die Bedeutung des Rorschach'schen Formdeutversuchs. *Die Biologie der Person.* (ed. T. Brugsch and F. H. Lewy), 1931, 2, 1044-1059.
- (20) Mira, L. E.: Sobre el valor del psicodiagnostico de Rorschach. *Progresos de la Clínica*, 1925, 808-845.
- (21) Mira, L. E.: Exploración de la afectividad. *Rev. méd. de Barcelona*, 1930, 14, 222 - 259.
- (22) Monnier, M.: Le test psychologique de Rorschach. *Encéphale*, 1934, 29, 189 - 201; 247 - 270.
- (23) Müller, M.: Der Rorschachsche Formdeutversuch, seine Schwierigkeiten und Ergebnisse. *Ztschr. f. d. ges. Neur. und Psychiat.*, 1929, 118, 598 - 620.

- (24) Oeser, O. A.: Some experiments on the abstraction of form and colour. Part II. Rorschach tests. *Brit. J. Psychol.*, 1932, 22, 287-323.
- (25) Pfister, O.: Ergebnisse des Rorschachschen Versuches bei Oligophrenen. *Allg. Ztschr. f. Psychiat.*, 1925, 82, 189-223.
- (26) Powell, M.: Relation of scholastic discrepancy to free associations on the Rorschach tests. *Kentucky Person. Bull.*, 1935, No. 14.
- (27) Rorschach, H.: Psychodiagnostik: Methodik und Ergebnisse eines wahrnehmungsdiagnostischen Experiments. Bern: Bircher, 1921, pp. 174.
- (28) Rorschach, H. and Oberholzer, E.: Zur Auswertung des Formdeutversuchs für die Psychoanalyse. *Ztschr. f. d. ges. Neur. und Psychiat.*, 1923, 82, 240-274. Also translated: Application of the interpretation of form to psychoanalysis. *J. Nerv. and Ment. Dis.* 1924, 60, 225-248; 359-379.
- (29) Rorschach, H.: Psychodiagnostik. Berlin: Huber, 1932, pp. 227. (Contains #27 and #28)
- (30) Salas, J.: El psicodiagnóstico de Rorschach. *Arch. de neurobiol.*, 1932, 12, 316 - 339.
- (31) Vernon, P. E.: The Rorschach ink-blot test. *Brit. J. Med. Psychol.*, 1933, 13, 89 - 118; 179 - 200; 271 - 291.
- (32) Vernon, P. E.: Recent work on the Rorschach test. *J. Ment. Sci.*, 1935, 81, 894 - 920.

THE EFFECT OF WIDE DIFFERENCES IN THE EDUCATION OF PARENTS
UPON THE BEHAVIOR OF THEIR CHILDREN

POLLY BOUCK¹

Studies have been made of numerous factors in family relationships as influencing behavior problems in children. The ordinal position of the child in the "family constellation," family size, age and I.Q. differences, and sex of siblings have all been checked from this standpoint. To the best of the writer's knowledge, however, this article records the first attempt to discover what effect, if any, is produced in the tendency of a child toward problem behavior by the existence of a marked difference between the educational backgrounds of his two parents.

It would be a reasonable armchair assumption that some such effect might be observable. There is, too, a certain amount of clinical evidence that behavior problems can in some cases be traced to the incompatibility resulting from wide differences in the parents' educational accomplishments. Thus Sayles (5), in discussing the case of an eight-year-old girl who had come to the attention of a guidance clinic (p.48), says, "The father.... had put himself through college and was inordinately proud of himself and his accomplishments; the mother, who had gone only part way through high school, was 'full of humility and revolt'--feelings which were kept at a high pitch by her husband's jeering attitude toward her efforts at self-education." Mowrer (3), in his classification of "family tensions," includes cultural differentiations (p. 207). Lindquist (2) considers education important as affecting the philosophy of life, abilities, and personalities of the marriage partners (p. 66). D. N. Levy (1), in considering maternal over-solicitude, mentions as significant factors thwarted careers and lack of social interests in common with the husband - which might be due to educational differences.

Attempting to discover whether any real relationship exists between wide divergences of education in the parents and problem behavior in children, the present study made use of actual home situations. Two groups of thirty-four matched pairs of children were used. The cases were selected from children brought to the University of Minnesota Institute of Child Welfare for routine mental tests. These children were not regarded as special "problems"; the reason for bringing them was general interest in their level of development. This point should be kept in mind in interpreting the results, since if the subjects had been chosen from a group of "problem" children, more clear-cut results might have appeared. The age-range of the subjects was from four to eleven years with half the cases concentrated at the ages of seven and eight.

The children were divided into two groups - those whose parents had about the same amount of education composed the control group, while the experimental group consisted of those whose parents' educational background showed a difference of at least four years. The median educational gap was six years. The families

¹From the Institute of Child Welfare, University of Minnesota.

studied were all in the three upper groups of the socio-economic scale,¹ and the children's I.Q.'s ranged from 89 to 146, with the median at 114. Each member of the experimental group was paired with a control, matching on the basis of age, sex, I.Q., age of parents, education of father, and ordinal position in the family. In the control group the mother's and father's education differed in no case by more than three years.

Information was secured during home interviews, by the following means:

1. General Questionnaire. A questionnaire designed to disclose aspects of home behavior and treatment. This was filled out by the investigator during the interview with the mother. Questions were included on the child's health, appetite, sleep, behavior and personality difficulties, home habits, school life, social life, and parents' interests and activities.
2. List of Behavior Traits. The list, which was taken from that used by Wickman (6) in his study of teachers' attitudes toward children's behavior, was marked by the mother according to the frequency with which she observed each form of behavior in her child.
3. Play List. A short list of plays, games, and amusements. This was marked by the interviewer, who questioned the child as to which of the activities he engaged in, liked, or disliked.
4. Rogers Personality Adjustment Test (4). Children of nine or over (excepting one pair) and some of the brighter eight-year-olds were given a slightly abbreviated form of this test.

RESULTS

Data from the "Behavior Traits" records were manipulated as follows: The frequency marked for each trait was used as the child's score for that trait. Then 1. separate average scores were computed for the experimental and control groups for each trait; 2. total average scores were obtained for the experimental and control groups; 3. a total problem score was obtained for each child. Scores for certain groups of traits were also computed; 1. "withdrawal" traits, including shyness, daydreaming, oversensitiveness, sullenness, fearfulness, unhappiness, carrying grudges, suspiciousness; 2. "serious"² traits, including shyness, oversensitiveness, sullenness, fearfulness, unhappiness, stealing articles or money, suspiciousness, domineering, cruelty or bullying.

Comparative results for the two groups are presented in the following tables:

¹Minnesota Scale. Group I (professional) 10 cases; Group II (semi-professional and managerial) 6 cases; Group III (clerical, skilled trades, and retail business) 18 cases.

²Traits judged as "serious" by mental hygienists, in Wickman's investigation (6).

TABLE 1

Traits In Which Control Mean Exceeds Experimental Mean

	Mean	Range	S.D.	S.D. m	Diff.	S.D. Diff.	<u>Diff.</u> S.D. Diff.
<u>Total Score</u>							
E	27.4	3 to 50	11.40	1.95			
C	29.4	10 to 44	7.99	1.37	2.00	2.39	.84
<u>Daydreaming</u>							
E	.85	0 to 3	1.03	.18			
C	1.20	0 to 3	1.10	.19	.35	.26	1.36
<u>Interrupting</u>							
E	1.47	0 to 3	.98	.17			
C	1.85	0 to 3	1.00	.17	.38	.24	1.59

TABLE 2

Traits In Which Experimental Mean Exceeds Control Mean

	Mean	Range	S.D.	S.D. m	Diff.	S.D. Diff.	<u>Diff.</u> S.D. Diff.
<u>Serious Problems</u>							
E	5.56	0 to 12	2.33	.40			
C	4.56	0 to 10	2.55	.44	1.00	.59	1.69
<u>Over-sensitiveness</u>							
E	1.65	0 to 3	1.21	.21			
C	1.03	0 to 3	.92	.16	.62	.26	2.38
<u>Domineering</u>							
E	1.24	0 to 3	1.17	.20			
C	.76	0 to 3	.80	.14	.48	.24	1.99
<u>Problems, General Questionnaire</u>							
E	8.56	0 to 26	5.83	.99			
C	7.53	0 to 16	3.99	.68	1.03	1.21	.85
<u>Withdrawal Traits</u>							
E	5.15	0 to 11	3.27	.56			
C	4.91	0 to 10	2.64	.45	.24	.721	.33

Traits showing greater incidence in the control group outnumbered those of the experimental group more than four to one. Arranged in descending order of the statistical significance of the difference, traits appearing more frequently in the control children were stubbornness, lying, inattentiveness, stealing articles, meddling, stealing food, acting "smart," carelessness, destroying property, nervousness, disobedience, masturbation, enuresis, fearfulness, stealing money, lack of interest, slovenliness, temper outbursts, rudeness, cruelty or bullying, profanity, waddling, sullenness, cheating, unhappiness. The standard error of the difference ranges from 2.6 for stubbornness to .40 for unhappiness. In the experimental group, greater incidence was found in the following traits; imaginary tales, shyness, impertinence, sissy or tomboy behavior, quarrelsomeness, and overactivity, the standard error of the difference ranging from 1.32 for imaginary tales to .37 for overactivity.

When the individual problems are considered the odds are certainly against the control group. But the experimental group shows a considerably larger incidence of serious problem traits, taken as a whole, than the control group.

The ten members of the experimental group whose parents' education differed most widely were compared with the ten in the experimental group whose parents had the most nearly equal amounts of education. Table 3 shows the results obtained:

TABLE 3

Relation of Problem Scores to Amount of Parents' Educational Divergence

	Mean	Range	S.D.	S.D. m	Diff.	S.D. Diff.	Diff. S.D. Diff.
<u>Total Score</u>							
Widest	31.4	18 to 50	9.81	3.10			
Narrowest	26.8	13 to 39	11.57	3.66	4.6	3.31	1.39
<u>Withdrawal Traits</u>							
Widest	6.5	1 to 11	2.87	.91			
Narrowest	4.5	0 to 10	3.58	1.13	2.0	1.45	1.38
<u>Serious Problems</u>							
Widest	7.3	3 to 12	2.58	.82			
Narrowest	4.7	0 to 11	4.10	1.30	2.6	1.54	1.69
<u>Problems from General Questionnaire</u>							
Widest	10.2	4 to 26	6.62	2.09			
Narrowest	7.2	0 to 16	5.97	2.28	3.0	3.09	.97

The fact that these differences are all in the expected direction tends to strengthen the supposition that there is some relation between educational differ-

ences of parents and children's behavior, as a group trend.

FURTHER FINDINGS OF THE STUDY

1. Comparison of the Problem Scores. The scores were compared for twelve children whose mother's education exceeded the father's, and twenty-two children whose father's education exceeded the mother's. The differences were found to be extremely slight. For each group of traits, however, the problem score tended to be higher for the group whose fathers had more education than the mothers. In view of this fact, correlations were obtained for the entire group between mother's education and three of the problem scores, with the following results:

	r	P.E.
Mother's education and low total problem score	+.054	.082
Mother's education and low withdrawal score	+.053	.082
Mother's education and low serious problem score	+.110	.081

The correlation is in the expected direction, but so low as to be negligible.

2. General Questionnaire. Few of the scores showed any appreciable differences between the two groups, though the experimentals exceeded the controls rather markedly in irresponsibility. There appeared to be a slight tendency for the experimentals to be less well adjusted socially. In their willingness to accept responsibility, for instance, the controls were a long jump ahead of the experimentals. More of the experimentals seemed to be ill at ease with adults, and a larger proportion of them preferred solitary play or reading to social play. The experimentals attended movies more often than did the controls, and took (generally) a less active and less willing part in home duties. More of them, too, receive no spending money. In regard to the controls, "talking too much" was given much more frequently as a source of annoyance than in the case of the experimentals.

3. Rogers Personality Adjustment Test. This was given only to ten pairs of children, the older or brighter ones. The scores indicated that for these particular cases, even more than for the group as a whole, the experimental children exceeded the controls in withdrawal traits and in serious problems. Four out of five of the highest scores in family maladjustment were made in the experimental group. On the whole, it was found that the Rogers test did not appear to single out to any appreciable extent the same children whom the other criteria made out to be maladjusted. This may have been due to differences in the content of the data.

4. Play Interests. Judged by the score of plays and games liked, engaged in, disliked, and never played, there appeared to be a very narrow advantage in favor of the control group. Of the ten children having the highest "serious problem" score, five were among the ten liking the least number of play activities, and four of these five had withdrawal scores that ranked among the worst ten. On the other hand, none of the children having a low withdrawal or serious problem score appeared among those having the highest play scores. Thus, while a lack of interest in play may be symptomatic of poor adjustment, a high play score does not necessarily seem to be an indication of especially good adjustment.

5. Parents' Recreational Interests. There was some indication that problem scores tend to be lower in children of mothers who have a number of social interests. In this study it was found that mothers of children in the control group tended to be somewhat more interested in social activities outside the home than were the mothers of the experimental group. Further, children of the more socially inclined mothers in both groups tended to exhibit fewer problem traits - confirmation, to some extent at least, of the acknowledged salutary effect of a certain amount of "letting alone."

DISCUSSION OF RESULTS

There is discernible in the results of the various tests given, a slight but fairly consistent tendency for the children in the control group to be better adjusted. The experimental group exhibits a noticeably greater number of problems that mental hygienists consider serious. The apparent influence of a wide difference between parents' education on the incidence of serious behavior problems in their children becomes more striking when we compare the group having the least educational divergence with that having the most. At the same time, it must be said that there is not one difference which, when interpreted in the light of its standard error, reaches that desirable magnitude so pridefully referred to in some circles as "practical certainty." There are tremendous individual differences and a great deal of overlapping between the two groups.

It is obvious that all the results obtained in this investigation were subject to numerous sources of error. The group studied was small, and despite the careful matching of as many objective factors as possible, there were many immeasurable factors that could not be controlled. On the part of both the investigator and the parents interviewed, there was bound to be variation in the interpreting of terms, though it may reasonably be supposed that coloring of results was not more frequent in one group than in the other. The writer is inclined to interpret the results as "somewhat positive," while emphasizing the fact that wide individual variation was evident among the members of both groups.

SUMMARY

In this study of thirty-four matched pairs of children, the parents of the experimental group differed four years or more in the amount of their education, while those of the control group had approximately equal amounts of education.

The children in the control group were found to exceed those in the experimental group in the incidence of problem behavior as a whole, but the children of the experimental group more frequently displayed problems considered by mental hygienists as serious.

The children in the experimental group were a little less well adjusted socially, and less mature in the assumption of responsibility. They were also slightly behind the control group in participation in and liking for play activities common to their age levels. The control group, however, made the poorer showing on the Rogers Personality Adjustment Test, with the possible exception of family maladjustment.

Mothers having markedly social interests reported less problem behavior in their children than did mothers whose chief interest was in home activities or solitary forms of recreation.

Virtually none of these results was clear-cut, and there was wide individual variation in all respects in both groups.

REFERENCES

- (1) Levy, D. M.: Address before American Psychiatric Association and Social Science Research Council. *Am. J. Psychiatry*, 1930, 9, 900-904.
- (2) Lindquist, Ruth: *The family in the present social order*. Chapel Hill, Univ. of North Carolina Press. 1931.
- (3) Mowrer, E. R.: *Family disorganization*. Univ. of Chicago Press. 1927.
- (4) Rogers, C. R.: "Measuring personality adjustment in children nine to thirteen years of age." *Teach. Coll. Contrib. Educ.*, 1931, No. 458.
- (5) Sayles, Mary B.: *The problem child at home: A study in parent-child relationships*. New York: The Commonwealth Fund. 1928.
- (6) Wickman, E. K.: *Children's behavior and teachers' attitudes*. New York: The Commonwealth Fund. 1928.

THE RELIABILITY OF ANTHROPOMETRIC MEASUREMENTS TAKEN ON
EIGHT- AND NINE-YEAR-OLD WHITE MALES

HOWARD V. MEREDITH¹

INTRODUCTION

Available reports of anthropometric research are sufficient to enable one to make a reasonably complete description of the physical growth of the normative or average white child between infancy and maturity. In contrast, the situation is almost the reverse when one attempts to go beyond the normative child to investigative work directly concerned with the course of physical growth for the individual. Research publications to date include but a meager scattering of findings having reference to age-to-age trends for the individual in either body dimensions or body proportions.

Many of those now engaged in physical growth research are cognizant of this present status of the field and, consequently, are placing major emphasis on the need for longitudinal studies. At numerous research centers there are consecutive measurement programs in process which are primarily intended to yield information on the growth of the individual child. It is becoming increasingly evident, however, that to investigate the growth of the individual is a technically difficult task.

Lincoln (1) presented experimental evidence to show that even where data are collected by trained anthropometrists it does not follow that they are of such accuracy that only negligible differences occur from observer to observer or upon immediate repetition by the same observer. The writer has recently examined series of individual curves for four dimensions of the trunk. These curves covered the age period from seven to sixteen years and were drawn in part to semiannual observed values and in part to annual increment values. A large number of the curves showed abrupt irregularities which were obviously spurious, while almost all the trends were characterized by fluctuations most probably due to errors of measurement (See, for instance, p. 102, Plate B). In view of the fact that the data for these trends had been accumulated at two major research centers, it would appear that if measurement artifacts are not to minimize seriously the value of individual curves the basic measurements must approximate perfect reliability. Certainly for the study of such refined problems as seasonal variations in growth or the influence of childhood diseases on growth (if it is possible to study these factors for the individual), determination of the serial measurement values will demand unusual precision.

PURPOSE

The above discussion is considered to imply that the planning of long-term studies of physical growth - studies intended to elucidate the growth of the individual child - will be facilitated by research investigations which indicate

¹From Iowa Child Welfare Research Station, State University of Iowa, Iowa City, Iowa.

the degree of accuracy of measurement obtainable on various parts of the living body at different stages of its development. It is the purpose of this paper to report such an investigation for a series of physical measurements made on eight- and nine-year-old white males. Specifically, the aim of the present study is twofold: first, to present reliability tables for each of fifteen anthropometric dimensions, these tables to be derived from measurement observations taken under relatively optimum (in contrast to routine) conditions; secondly, to relate each reliability table to the rate of growth for the dimension it represents. This latter procedure is intended to yield an estimate of the time frequency at which consecutive measurements for each of the dimensions under study are profitably made.

MEASUREMENTS

The fifteen anthropometric dimensions selected for study are itemized below. Each item is complemented by a descriptive statement of the measurement technique employed in determining the dimension.

Stature: The instruments used were the Baldwin Paper Measuring Scale and Square. The subject stood erect with heels almost touching each other. Heels, buttock, upper part of back, and rear of head were against the wall to which the scale was attached. The arms were permitted to hang at the sides of the body in a natural position, the heels were in firm contact with the floor, and the head was held on the Frankfort Horizontal. One face of the square was so placed against the scale that the other face was horizontal with the floor. The anthropometrist then brought down the square with sufficient force to crush the subject's hair and made the reading.

Sitting Height: The instruments were the same as for stature. The subject sat on a horizontal walnut bench 30 centimeters in height. His knees were flexed and spread apart, his ankles crossed, and his hands rested on his thighs. The posterior aspect of the trunk made contact with the scale both at the sacral region and at the thoracic region. The square was brought down firmly on the vertex (the highest point of the head when held on the Frankfort Horizontal) and the measurement recorded as the distance from this point to the surface of the bench.

Bi-acromial Diameter: Standardized large sliding calipers having broad flat branches were used in taking this measurement. The subject assumed the erect position with his arms hanging at his sides. In an attempt to standardize this diameter as much as possible, the anthropometrist stood behind the subject and drew back the subject's shoulders until the bodies of the two scapulae lay approximately in one plane. The measurement was determined as the distance between the most lateral points of the acromial eminences.

Bi-iliac Diameter: This measurement was taken as the straight distance between the most lateral points of the crests of the ilia. The instrument used was the same as for the previous dimension. The observer stood in front of the subject, brought the face of each branch of the calipers squarely in contact with the landmark, and applied the maximum pressure that could be exerted without pain to the subject. In the event that the subject appeared to turn his trunk and

hips at the time the pressure was applied, the measurement was checked.

Bi-trochanteric Diameter: The subject stood erect with legs together and feet parallel. The most external prominences of the greater trochanters were the terminal measurement points. Pressure was applied to the large sliding calipers until considerable resistance of the bones was felt.

Bi-condylar Diameter of Humerus: This measurement was taken on the upper left extremity by means of the large sliding calipers. The left arm of the subject was raised forward to approximately the level of the shoulder and the forearm flexed upward at right angles to the arm. The branches of the calipers were then applied against the epicondyles of the humerus in such a manner as to bisect the angle of the elbow and lie in the plane of the arm and forearm. Heavy pressure was used, care being taken that the forearm did not move out of line with the branches of the calipers and tip in toward the midline of the body.

Bi-condylar Diameter of Femur: Here the large sliding calipers were used and the maximum straight distance obtained between the condyles of the left femur. The knee of the subject was flexed sufficiently to relax and largely remove the musculature at the lateral aspects of the condyles. The branches of the calipers bisected the thigh-leg angle as they were brought in contact with the bony prominences. Considerable pressure was used. The anthropometrist stood in front of the subject while taking this measurement.

Circumference of Thorax: A steel millimeter tape was used to determine this measurement. The subject stood in a natural manner with head erect and with arms relaxed and held slightly away from the sides of the body in order to permit the passing of the tape around the thorax. The observer stood in front of the subject and, using the xiphoid cartilage of the sternum as the anterior landmark, placed the tape around the thorax at right angles to the spinal column. Posteriorly, the tape always rested below the inferior angles of the scapulae. The tension applied was only sufficient to insure complete contact with the skin. Record was made of the median value during normal respiration.

Circumference of Arm: The instrument employed in securing this and the three succeeding limb girths was the steel millimeter tape. As with thoracic circumference, the tape was applied to make contact all around and yet avoid compression of the tissues. All observations were taken on the left extremities of the body.

Arm circumference was measured near the middle of the humerus, at the level of the greatest girth over the biceps muscle and below the insertion of the deltoid muscle. The plane of the tape was at right angles to the line of the humerus. During measurement the subject assumed the erect position with the upper extremities hanging near the sides of the body (slightly abducted) in a relaxed condition.

Circumference of Forearm: The position of the limb was the same as for the previous measurement, and identical technique was used except that the observation was taken at the level of the greatest girth below the elbow joint and in the

region of the radiale. Care was taken to see that the musculature of the forearm and hand was relaxed.

Circumference of Thigh: The subject stood with his feet spread about 9 inches apart and his weight equally distributed on both lower extremities. The tape was passed around the thigh at right angles to its long axis and the measurement made at a level just below the gluteal sulcus.

Circumference of Leg: The subject maintained his position as for the previous measurement and the maximum girth of the calf at right angles to its long axis was determined.

Thickness of Skin and Subcutaneous Tissue at Thorax Back: This measurement, together with the two measurements which remain to be described, was taken with so-called "fat" calipers devised by the American Child Health Association. In all three instances the flat, blunt-nosed branches of the calipers were held parallel to the long axis of the body or extremity of the subject.

In taking the measurement at the rear of the thorax, the anthropometrist placed the thumb and first finger of his left hand about 40 millimeters apart over the region below and slightly lateral to the inferior angle of the left scapula and in the transverse plane of the xiphoid cartilage. He then moved these digits directly toward each other, taking care that they did not tend away from the thorax. The instrument was next applied to the tissue held between his thumb and finger and the measurement read off. The objective was to measure the thickness of a complete double layer of skin and subcutaneous tissue without including any muscle tissue.

Thickness of Skin and Subcutaneous Tissue at Arm Back: This measurement was taken over the triceps muscle at approximately the mid-point of the shaft of the left humerus with the arm hanging in a relaxed condition. The technique was the same as for the previous measurement.

Thickness of Skin and Subcutaneous Tissue above Iliac Crest: The calipers were applied immediately superior to the crest of the left ilium in a line vertical with the left axilla. The size of the bite taken between the digits of the anthropometrist varied with the amount of subcutaneous tissue of the individual subject.

All measurements were made on the nude subject and recorded to the nearest millimeter.

SUBJECTS

The subjects were twenty-five Iowa City boys enrolled in the third and fourth grades of the University of Iowa Elementary school during the year 1935-1936. Each boy was scheduled to serve as a subject for the study seven successive times, once every four weeks beginning November 13 or 14 and ending April 29 or 30. Occasional absences reduced the total number of examinations made to 163. The youngest boy in the group was seven years, eight months at the time the first ex-

amination was made, and the oldest boy was ten years, three months by the time of the final examination.

The principal reason for accumulating the data on twenty-five individuals rather than on 163 different individuals lay in the fact that this smaller group was already under observation in connection with a serial growth study. In addition to being conveniently available, however, the sample was found to represent considerable dispersion in body size and build. The eight-year-old boys ranged between 128.0 cm. and 143.9 cm. for stature, between 57.2 cm. and 66.6 cm. for thoracic circumference, and between 33.4 cm. and 43.5 cm. for girth of thigh. The shortest boy had the largest thigh circumference and the tallest boy the second smallest girth of thorax. Similar deviation characterized the nine-year-olds. Stature ranged from 132.6 cm. to 152.7 cm., bi-iliac diameter from 19.9 cm. to 24.1 cm., and arm girth from 17.4 cm. to 23.1 cm. The tallest boy had the largest bi-iliac diameter while the shortest had the largest circumference of arm.

EXAMINATION PROCEDURE

The procedure at each examination was as follows:

1. The subject removed all clothing.
2. The anthropometrist made observations for each of the fifteen measurements being investigated and serially called off the observed values to a recorder. Usually the order of measurement was, first, sliding caliper dimensions, secondly, tape dimensions, thirdly, measurements of skin and subcutaneous tissue, and finally, measurement of stature and sitting height.
3. The anthropometrist left the examination room for a period of approximately ten minutes. During this time the child was serving as a subject in another experiment.
4. On returning to the room, the anthropometrist took a second series of measurement observations for the same fifteen physical dimensions.

It will be noted that the number of dimensions studied, the order of measurement, and the time interval between initial and second measurement all operated in the direction of minimizing the factor of memory on the part of the anthropometrist.

Throughout the entire period of the collection of the data, the measurements were made by the writer and recorded by Dr. Newell C. Kephart. On all occasions extraordinary care was taken to measure each dimension as accurately as possible and to avoid errors of recording.

RELIABILITY FINDINGS

As has been implied in the foregoing discussion, the data consist of 163 pairs of observations (a pair of observations being composed of an initial measurement and a remeasurement after an interim of ten minutes) for each of fifteen anthro-

pometric dimensions. These data were analyzed by (1) obtaining the difference, without regard to sign, between each pair of observations and (2) constructing a reliability table based upon the fifteen series of difference values.

The results of the analysis are given in Table 1. Selected findings revealed by this table are:

1. Bi-condylar diameter of the femur was measured with less absolute error than any of the other fourteen dimensions studied. In contrast, the measurement made with the least consistency from one reading to another was bi-acromial diameter.
2. Other highly reliable dimensions which closely approximated bi-condylar diameter of femur were bi-iliac diameter, bi-condylar diameter of humerus, and the three measurements of skin and subcutaneous tissue. Next to bi-acromial diameter, thoracic circumference was the dimension of lowest absolute reliability.
3. Stature was more accurately determined than either sitting height or circumference of thigh.
4. The absolute measurement errors were greater for bi-trochanteric diameter than for bi-iliac diameter.
5. Of the four girths of the extremities, leg girth was measured with the greatest consistency.

Findings supplementary to the above were sought (1) by expressing the median and maximum values from Table 1 in relation to the actual size of the dimension to which each applied, and (2) by calculating the coefficient of reliability for each of the fifteen dimensions. Table 2 gives the obtained results. The reliability coefficients were calculated, as is customary, by the Pearson product-moment method of correlation. Means of absolute magnitude for the various dimensions, specific for boys nine years of age, were available in studies by Meredith (2) and by Meredith and Boynton (3).

Table 2 shows:

1. The reliability medians given in Table 1, when referred to the mean magnitude of their respective dimensions, equal less than one-fifth of 1 per cent for stature and bi-iliac diameter; less than one-half of 1 per cent for leg girth, bi-trochanteric diameter, bi-condylar diameter of femur, sitting height, thoracic circumference, and girths of forearm and arm; approximately 1 per cent for girth of thigh, bi-condylar diameter of humerus, and bi-acromial diameter; and roughly 4 per cent for the three measurements of skin and subcutaneous tissue.
2. The maximum measurement differences given in Table 1 range from less than 1 per cent of the mean size of their corresponding dimensions to upwards of 20 per cent. The percentage is lowest for stature; between 1 and 4 for measurements of hip width, limb girth, and thoracic circumference; around eight for bi-acromial diameter; and above twenty for the measurements of skin and subcutaneous tissue.

TABLE I

Reliability Constants for Fifteen Anthropometric Dimensions: Each Series of Constants Was Derived from Values Representing the Difference Between Two Measurements Taken in Succession on the Same Subject

Difference Interval (mm.)	Stature		Sitting Height		Thoracic Circumference		Bi-acromial Diameter	
	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent
0 to 1	69	42.3	54	33.1	71	43.6	46	28.2
2 to 5	66	40.5	75	46.0	53	32.5	64	39.3
6 to 10	26	16.0	28	17.2	28	17.2	38	23.3
11 to 15	2	1.2	6	3.7	9	5.5	9	5.5
16 to 25					2	1.2	6	3.7
	163	100.0	163	100.0	163	100.0	163	100.0
Median		2.0		2.7		2.4		3.5
90th Percentile		7.5		7.8		9.1		10.3
Maximum		12.		15.		20.		24.
Difference Interval (mm.)	Arm Girth		Forearm Girth		Thigh Girth		Leg Girth	
	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent
0 to 1	104	63.8	113	69.3	42	25.8	119	73.0
2 to 5	56	34.4	47	28.8	82	50.3	44	27.0
6 to 10	3	1.8	3	1.8	35	21.4		
11 to 15					4	2.5		
	163	100.0	163	99.9	163	100.0	163	100.0
Median		.9		.8		3.2		.8
90th Percentile		3.9		3.2		7.8		2.6
Maximum		7.		7.		12.		5.
Difference Interval (mm.)	Bi-trochanteric Diameter		Bi-iliac Diameter		Breadth of Elbow		Breadth of Knee	
	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent
0	65	39.9	95	58.3	77	47.2	103	63.2
1	52	31.9	51	31.3	66	40.5	53	32.5
2	16	9.8	15	9.2	20	12.3	7	4.3
3	17	10.4	2	1.2				
4 to 7	13	8.0						
	163	100.0	163	100.0	163	100.0	163	100.0
Median		.8		.4		.6		.3
90th Percentile		3.3		1.5		1.7		1.3
Maximum		7.		3.		2.		2.
Thickness of Skin and Subcutaneous Tissue:								
Difference Interval (mm.)	At Arm Back		At Thorax Back		Above Iliac Crest			
	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent		
0*	72	44.2	100	61.3	88	54.0		
1*	77	47.2	58	35.6	57	34.9		
2*	11	6.8	3	1.8	11	6.8		
3 and 4*	3	1.8	2	1.2	7	4.3		
	163	100.0	163	99.9	163	100.0		
Median		.6		.3		.4		
90th Percentile		1.5		1.3		1.7		
Maximum		3.		3.		4.		

*This series of differences is for the actual measurement of a double layer of tissue. One-half the values given would afford an estimate of the errors of measurement for a single layer.

TABLE 2

Reliability Findings Supplementary to Those Given in Table 1

Dimension	Median from Table 1 x 100	Maximum from Table 1 x 100	Reliability
	Mean Size of Dimension	Mean Size of Dimension	Coefficient
Stature	.15	.90	.993
Bi-iliac diameter	.19	1.40	.994
Girth of leg	.30	1.86	.991
Bi-trochanteric diameter	.35	3.02	.982
Bi-condylar diameter of femur	.36	2.42	.972
Sitting height	.38	2.10	.974
Thoracic circumference	.38	3.21	.977
Forearm girth	.42	3.63	.972
Girth of arm	.47	3.63	.986
Thigh girth	.81	3.04	.978
Bi-condylar diameter of humerus	1.09	3.65	.935
Bi-acromial diameter	1.20	8.22	.919
Thickness of skin and subcutaneous tissue:			
At thorax back	3.66	36.59	.941
Above iliac crest	4.02	40.16	.940
At arm back	4.69	21.74	.948

3. The coefficients of reliability range from .82 to .99, being highest for bi-iliac diameter and stature and lowest for bi-condylar diameter of humerus and bi-acromial diameter.

FINDINGS FOR RELIABILITY IN RELATION TO RATE OF GROWTH

In a paper published in 1930, Lincoln (1) pointed out that in the interpretation of the significance of anthropometric reliability constants it is important to consider their relationship to increments of growth. Backing his discussion with some illustrative material, he wrote:

"....Children 10, 11, and 12 years old are growing at the rate of about 5 cm. a year in standing height, for example. An error of one centimeter is less than 1% of the actual height of the child, but it is 20% of the increment of growth. If an error of this size is made in opposite directions in two successive years.... then the error in the increment becomes 40%.

"The same situation exists for traits other than standing height, except that in some cases the error is proportionally much greater. The iliac diameter of children from 10 to 12 years

old is growing at the rate of only about one centimeter a year. Thus an error of only half a centimeter will in many cases be an error as great as the individual's yearly increment." (1, p. 449-450)

Since this relationship between reliability and growth increment was not developed in Lincoln's paper beyond the general statement just quoted, it appeared pertinent that the present investigation include a specific study of the question. Increment values for the various measurements were obtained from research reports by Meredith (2) and by Meredith and Boynton (3). These values gave the mean gains for eight- and nine-year-old boys in millimeters per year. The ninetyeth percentiles given in Table 1 were adopted as reliability thresholds for the respective measurements. In the adoption of these percentiles as the criterion reliability values, the assumption was made that seriatim observations are only profitably made at such intervals as the mean increment of growth equals or exceeds 90 per cent of the reliability differences.

Findings on the relationship, specific for eight- and nine-year-old boys, are shown in Table 3. The first three columns of the table give, in turn, the series of dimensions under consideration, the annual rate of mean growth in each dimension, and, the ninetyeth percentiles of reliability distributions for each dimension. A fourth column furnishes an estimate of the maximum time frequency at which seriatim observations for the purpose of studying the growth of the individual appear practically useful.

It will be noted that Table 3 does not include the three measurements of skin and subcutaneous tissue. The reason for this lies in certain tentative indications that growth trends for these measurements are of an undulating or multicyclic form. Obviously, to the extent that subcutaneous tissue registers the nutritional fluctuations of the individual from week to week or month to month, the mean gain or loss for this tissue in annual terms becomes inadequate for determining the frequency at which measurements are profitably made.

SUMMARY AND CONCLUSIONS

Reliability tables, specific for boys eight and nine years old, are presented for each of fifteen anthropometric dimensions. These tables were derived from pairs of measurement observations taken under unusually favorable conditions. Without exception the measurements were made by one anthropometrist. Numerous findings are drawn from the tables. For example, iliac diameter is found to be a more reliable measurement of hip width than bi-trochanteric diameter.

Reliability constants are selected to represent given body dimensions, and each constant is referred to the annual rate of growth for the dimension. In this manner estimates are obtained of the maximum frequency at which seriatim observations for the various dimensions are profitably made. It is found that while some dimensions are taken to advantage at bi-monthly or quarterly intervals, others appear to make no significant contribution to individual growth trends at intervals of less than one year. This finding is considered to have unequivocal implications for the planning and execution of seriatim growth studies. Certainly

TABLE 3

Relationship Between Anthropometric Reliabilities and Growth
Increments for Eight- and Nine-Year-Old Boys

Dimension	Mean Annual Increment (mm.)	Reliability Criterion (mm.)	Estimated Maximum Frequency of Measurement*
Stature	54	7.5	Bimonthly
Bi-iliac diameter	8	1.5	Quarterly
Girth of leg	10	2.6	Quarterly
Bi-trochanteric diameter	10	3.3	Quarterly (?)
Sitting height	21	7.8	Semiannually
Thoracic circum- ference	22	9.1	Semiannually
Girth of thigh	16	7.8	Semiannually
Forearm girth	6	3.2	Semiannually
Arm girth	7	3.9	Semiannually (?)
Bi-condylar diam- eter of femur	2	1.3	Annually
Bi-acromial diam- eter	10	10.3	Annually
Bi-condylar diam- eter of humerus	1	1.7	Biannually

*Some investigators may regard these estimates as too stringent and, alternatively, favor the method of obtaining measurements at one-half the time frequencies given and smoothing the individual curves derived therefrom. The writer is not opposed to this procedure except as it results in a program where frequency of measurement tends to function as a substitute for precision of measurement.

the procedure of taking a constant battery of measurements at every examination is indicated to be untenable.

Succinctly, this paper furnished quantitative evidence leading to the conclusion that efficient and economical research on the physical growth of the individual child lies (1) in a differential approach to anthropometric dimensions and (2) in employment of unusually rigorous measurement technique.

REFERENCES

- (1) Lincoln, Edward A.: The reliability of anthropometric measurements. *Ped. Sem. & J. Genet. Psychol.*, 1930, 38, 445-450.
- (2) Meredith, Howard V.: The rhythm of physical growth: A study of eighteen anthropometric measurements on Iowa City white males ranging in age between

birth and eighteen years. Univ. Iowa Stud., Stud. in Child Welfare, 1935, 11, No. 3, Pp. 128.

- (3) Meredith, Howard V., and Boynton, Bernice: The transverse growth of the extremities: An analysis of girth measurements for arm, forearm, thigh, and leg taken on Iowa City white children. Submitted for publication to *Biometrika*.

CARE OF PRIMARY TEETH

R. C. WILLETT¹

The term "primary" or "temporary" teeth as the deciduous dentures are frequently called, seems to carry with it a subtle but dangerous suggestion that prophylactic care of a child's teeth does not require the same consideration and skill in treatment as that given to the permanent ones. The persistent retention of this false idea in the minds of a majority of people is undoubtedly accountable for much early dental neglect that becomes a contributing cause of many childhood afflictions.

Structural defects of the primary teeth are comparatively rare when they erupt, but regardless of this initial protection by Nature, the chances are 90 to 1 that the child nourished on the average American family diet, and who has not been accorded the benefit of supervised prophylactic care will become the host to some form of dental disease before he reaches the age of four years.

Providing there are no structural defects in the enamel surfaces of the primary teeth when they erupt, and that the child's diet is sufficiently adequate to meet all physical requirements, professional dental services may be limited to instructions in the home care of the teeth. It is the mother's or nurse's duty to give personal care to the child's teeth until he has reached an age when he can be trained and depended upon to properly use a toothbrush and to thoroughly rinse his mouth.

As a cleansing agent, cold water is amply sufficient. When the teeth are properly brushed, there is little need for anything more than pure cold water and the vigorous use of a good toothbrush. Should stains appear upon the teeth that cannot be removed with the brush and cold water, it then becomes necessary to use a fine polishing substance to restore the natural luster of tooth enamel. Coarse abrasive substances such as powdered pumice stone should never be used. They scratch the enamel and readily invite another accumulation of stain. From the time of the eruption of the first tooth, this home care should be supplemented by professional dental inspection at regularly appointed times in accordance with case requirements.

Dental caries has its inception externally; never from within the tooth. If caries of the primary teeth is to be prevented, the child's mouth must be kept clean and absolutely free from all food remnants, particularly those of the sugar and starch kind. Ever present organisms of the mouth act upon starches and sugar, forming lactic acid by fermentation processes. The lactic acid thus produced acts directly upon the crystal-like rods composing the tooth enamel and establishes the onset of dental caries.

Caries, once formed in the enamel, becomes a serious matter if allowed to penetrate to the dentin. Unchecked, the micro-organisms make rapid inroads through

¹From Peoria, Illinois.

the dental tubuli and readily infect the internal vascular tissues - the pulp. The usual termination of such a pathological process is the forming of an alveolar abscess. Aside from the involvement of deeper seated structures, there is a partial or total loss of the tooth.

It is not claimed as yet that dental caries can be entirely prevented in the teeth of every child, but through a comparison of school records and mouth examinations the fact has been established that for the child who has been accorded the advantages of a wholesome diet, regular hours of exercise out in the open sunshine, undisturbed rest periods, and, after each meal and before retiring, such a thorough cleansing of the teeth that all decomposing starchy food is removed, decay of the primary teeth can be practically eliminated.

THE PREMATURE LOSS OF PRIMARY TEETH

The effect of the premature loss of a certain primary tooth, or even a series of losses, by one particular child differs widely from the effect of the same loss in the case of another child of the same age or state of dentition.

A few exceptional cases are usually found in a large group of mouth examinations; and the re-examination of these exceptional cases demonstrates the outstanding persistence of certain intrinsic factors which make for normal growth and development in spite of serious obstacles. Despite these exceptional instances of normal dentition after the premature loss of one or more primary teeth, it by no means follows that such loss is a matter of small importance, or one calling for less than the best professional skill and judgment. The fact remains unquestionable that bone growth and muscular force cannot be as evenly developed nor in so symmetrical a form as in the case of the child who sustains no such losses.

In the cases of children endowed with a robust physique, a normal relationship of the dental arches, and possessed of normal respiration, the loss of one or even two maxillary primary incisors at the age of two and a half years does not necessarily produce a marked effect upon dental arch formation and growth if function of the primary molars and canines remains unimpaired. The maintenance of function of the primary molars, canines, and first permanent molars seems to be of greatest importance in promoting normal arch growth. Except in a special case, such as that of a child who exhibits difficulty in speaking and is in danger of acquiring an undesirable speech habit, or one who takes part in professional theatrical productions and therefore must appear without a physical blemish, there is no justifiable reason for attempting the artificial replacement of prematurely lost maxillary primary incisors. This conclusion, however, is not equally justified in regard to the premature loss of one or more mandibular primary incisors, but even here the child of robust physique, normal dental arch relationship and unimpaired primary molars and canines, may suffer no serious dental disability. Should there be a variation from normal dental arch relationship or an inherent or acquired physical deficiency, then a mechanical support, if properly designed, may be indicated and serve to intercept malocclusion.

Dental caries, accidents, or ill-advised extractions are by no means the only

causes leading to the premature loss of primary teeth. Reasons for the onset of conditions tending to such untimely losses are still in question as they usually occur in the mouths of healthy and well growing children, and seem to follow as the result of advanced development of the permanent teeth, usually observed to be the premolars, lateral incisors and first permanent molars. These teeth, encroaching upon the roots of primary teeth, start an early absorption, particularly in those cases where the primary incisors stand close together. Under such circumstances, the primary canine loosens and, without warning or discomfort, is suddenly cast off. The space closes, thus affecting dental arch growth so seriously that insufficient space is afforded for the eruption and proper alignment of the permanent canine.

While the child may lose only one primary canine from such a cause, this deviation of dentition may occur in the four canine areas at approximately the same time, and such wide deviation would indicate that there must be an over-activity of unknown factors that govern the transition period from primary to permanent dentition.

Much credit is due Samuel J. Lewis for his pioneer research work in connection with this particular anomaly of primary and permanent dentition, and for his introduction of a term that he uses in describing it - "Ectopic Eruption of Permanent Teeth".

MALOCCLUSION OF THE PRIMARY TEETH

The biological reasoning of recognized physiologists, anatomists, embryologists, and anthropologists who lay no claim to orthodontic knowledge is that function is one of the determining factors in all growth processes. They do not discourage the orthodontist's efforts in attempting to correct abnormal tendencies that interfere with functional activities natural to body structure.

The biological principles of growth processes that have been recognized by these scientists are essential in a rational study of malocclusion and dental arch malformation in the young child. Through the early recognition of such anomalies, the primary causes can be studied while still active and before they become obscure through advanced growth. If there is an existing mechanical interference that in any way prevents a normal functioning of the primary teeth or inhibits the natural urge of dental arch growth, it is imperative that some well formulated plan of action for its correction should be taken. When properly constructed and skillfully applied, the delicate mechanism for such corrective treatment should not be the cause of discomfort to a child, and the results that may be obtained in the course of a few weeks or even days will, in many cases, be productive of more actual benefit to the child than years of corrective treatment at a later time in childhood or early youth.

THE EFFECT OF VARYING VERBAL INSTRUCTIONS ON THE MOTOR RESPONSES
OF PRESCHOOL CHILDREN

SUE COOK MCCLURE¹

Among the more fundamental concepts introduced by the progressive school is the principle that activities are to be child-initiated rather than teacher-initiated, and that freedom of the child to carry out his own ideas is to be encouraged, rather than obedience to the adult's ideas exacted. Since, however, the child must sometimes be guided by parents or teacher into routine activities or even into activities that are distasteful to him, the problem of direction remains an important one wherever the older methods of punishment and coercion have been rejected.

As attempted solutions of this problem, a number of principles and techniques have been proffered and widely accepted. Among these are such familiar rules as: never use commands when suggestion is possible; always use positive in preference to negative commands; encourage and praise rather than discourage and criticize. Psychometrists, especially, faced with the problem of establishing rapport in the giving of mental tests, have seized on this last rule.

Concerning these principles of child management through the use of language the question inevitably arises: To what extent are they justified in fact? Does the child actually respond better to suggestion than to commands, better to positive than to negative commands, and better to praise than to criticism? This experiment was devised to provide a partial answer to such questions.

Practical recommendations, of which the following are typical, have been given by writers in the field of child training or education. Abbott (1), writing at a time when absolute obedience was the desideratum, advocated using careful thought in giving commands, and allowing children the greatest freedom possible. Of modern writers, Blatz and Bott (3) maintain that commands are unnecessary if the child is guided into activity he likes, rather than subjected to negative commands and destructive criticism. Foster and Headley (8) emphasize the superiority of suggestion over command; and Thom (16) points out that commands stimulate the development of negative traits, whereas suggestion encourages persistence, curiosity, and initiative. Where commands are unavoidable, they should be clear and simple, given with reasons if possible, positive rather than negative, and consistently enforced in a take-it-for-granted manner. Faegre and Anderson (7) make similar recommendations and stress the greater effectiveness of praise than of blame. Poffenberger (14) maintains that the tendency to react positively to suggestion is stronger in younger than in older children.

Early studies on the influence of varying verbal instruction were concerned with the relative effectiveness of praise and reproof. Gilchrist (10) gave the Courtis English Test to two groups of psychology students, one of which was praised, the other reproved for poor performance, before taking the test a second

¹ From the Institute of Child Welfare, University of Minnesota.

time. He found that the praised group improved much more than the other. However, the fact that his groups were neither equal in size nor paired as to initial score may be a factor of importance in determining the trend of results. Gates and Rissland (9), who likewise failed to control the factor of initial ability, found only small differences in improvement on the three-hole and color naming tests among three groups of Barnard College students, one of which was praised, one blamed, and one given the test a second time without comment. Some comment proved somewhat more effective than mere repetition.

Briggs (4) in a study similar to Gilchrist's found that 87 per cent of junior high school pupils made better scores after commendation and encouragement than after reprimands and threats of punishment. Hurlock (11, 12) found that grade school children gained over six points in I.Q. when some comment, whether favorable or adverse, was made in a retest, but that they gained only one point or less when no comment was made. Similarly Chase (6), in a study of children's performances on the Motivation-Dynamometer and Perforation tests which she devised, reports that some motivation is more effective than none, but that failure accompanied by reproof is probably a more effective incentive than success accompanied by praise. Anderson and Smith (2) later repeated the Chase study, using 102 of the same subjects, and reported substantially the same results.

Waring (17) found language approval superior to non-language approval in facilitating simple discriminative processes among preschool children; and Wylie (18) found that 74 per cent of young children responded with obstinate behavior to negative commands, but not to positive commands.

Johnson (13) has investigated the influence upon behavior of different types of command and of positive and negative suggestion. Seventy-four children from the University Elementary School at the University of Michigan, ranging from two and a half to seven years old, were divided into a control and an experimental group and observed in 70 experimental situations. The six situations described in Johnson's published article were designed to measure the child's obedience to instructions and his persistence in several tasks when given specific or general commands, positive or negative commands, encouragement or discouragement, positive suggestion or a question, and hurrying or unhurrying commands. The author reports differences divided by their probable errors ranging from 1.02 to 25.80 in favor of the experimental group, with three of the six ratios exceeding 3.00. No age differences were found. She concludes that positive, unhurrying, specific, and encouraging types of instruction are more effective than negative, hurrying, general, and discouraging types.

Analysis of the literature shows, therefore, that whereas all the writings on practical child training consider praise and encouragement superior to blame and discouragement, there is considerable disagreement in the experimental studies as to the relative effectiveness of the two methods.

METHOD

Subjects. The subjects of this experiment were 22 children from the nursery school and 16 from the kindergarten of the Institute of Child Welfare of the Uni-

versity of Minnesota, 23 nursery school children from the Pillsbury Settlement House, and 16 kindergarten children from the Northeast Neighborhood House, Minneapolis. Settlement house children were included not only to increase the total number of subjects but also to make possible a study of the effect of familiarity with the experimenter on the children's behavior. Of the 77 subjects, 45 were nursery school children between 27 and 59 months old, with a mean age of 43.93 months, and 32 were kindergarten children ranging from 52 to 70 months, with a mean age of 59.28 months. Twenty nursery school subjects were boys, 25 were girls; 19 kindergarten subjects were boys, 13 were girls.

The subjects at the Institute of Child Welfare were given two forms of the experiment; the Pillsbury nursery school subjects, only Form I; and the Northeast Kindergarten subjects, only Form II. Of the 115 records, 44 were for Institute nursery school children, 32 for Institute kindergartners; 16 were for Northeast kindergarten subjects; and 23 for the Pillsbury subjects.

Place and equipment. The children were tested in their respective schools and kindergartens. The rooms used were in all cases set apart from the rest of the school and were alike in all essential respects. The materials used, all of which were kept in an appointed place, included the following: toy banks in the shape of houses; small colored pegs, some in a box, others scattered on the floor; stack of buff-colored drawing paper, row of five crayons; blunt scissors, sheet of orange paper containing drawings of a ball and a feather, printed university catalogues scattered on the floor. The arrangement of the materials varied somewhat between the two forms of the experiment, because of the different order in which the situations were presented. In addition to stop-watch, record blank, and conversation sheet, the experimenter had a child's drawing of a man, which was kept concealed until instruction 8A was given. The record sheet provided spaces for separate recording of responses to the theoretically superior (type A) and inferior (type B) instructions. In all cases the criterion for positiveness of response was motor rather than verbal, although space was provided for the child's and the experimenter's comments. Routine information as to the child's name and history was recorded at the top of the sheet.

Time. The data were gathered between February 3 and April 30, 1936. In all cases, records were made between 8:30 and 11:30 A.M. or between 2:30 and 3:30 P.M. The obtaining of individual records required from 15 to 30 minutes.

Instructions given. The instructions consisted of 15 pairs of verbal directions. With a few slight variations which are indicated in the list below, these were the same on the two forms of the test. A predetermined order, different for the two forms, was followed in presenting the several situations. Of the pair of instructions, A and B, given in each situation, the A series were theoretically preferable; that is, in keeping with the theories that suggestion is more effective than command, positive suggestion more effective than negative, etc. In giving Form I, the A form of instruction was given first in situations 1, 2, 3, 8, 10, 12; the B form first in situations 4, 5, 6, 7, 9, 11, 13, 14, 15; in giving Form II, the B type was given first in situations 1, 2, 3, 4, 5, 6, 7, 9, 11, 15, in order to control the factor of order or presentation. By breaking up the situations into two parts (telling the child that he might take another crayon now,

getting him to draw a second object, or guiding him back to a slightly different form of the same situation), each child's reaction to both the A and B forms of instruction was obtained in all situations except 4, 9, 12, and 15. In these situations, if the child reacted positively to the first form of instruction presented, he was not given the second form. This was made necessary because the method of control used was intra- rather than inter-child. Since young children are extremely sensitive to slight changes in the situation the child's reaction was considered a response to the language stimulus only if it occurred within a specified time, as indicated below. The time the child required to complete a task, or the time he persisted in his efforts, was recorded for situations 3, 11, 13, and 14. The situations and the forms of instruction used were as follows:

1. Request vs. command.

Child asked to pick up pegs (Form I) or books (Form II).

A. "I wonder if you will help me."

B. "Get to work!"

2. Specific vs. general command.

Continuation of situation 1.

A. "Pick up all the pegs (books) and put them in the box on the table." (Pointing).

B. "Put the pegs (books) away."

3. Unhurrying vs. hurrying instructions.

Continuation of situation 1. (Time record of performance).

A. "You can do it if you begin not."

B. "Hurry and do it. Hurry up!"

4. Positive vs. negative suggestion.

Child shown paper and crayons. (Time limit 15 seconds).

A. "You would like to draw something, wouldn't you?"

B. "You wouldn't like to use them, would you?"

5. Positive suggestion in form of statement of fact vs. positive suggestion in form of question.

Continuation of drawing situation. (Time limit 30 seconds).

A. "The next thing we are going to draw is a big, red ball."

B. "Would you like to draw a ball?"

6. Positive vs. negative command.

Continuation of drawing situation. (Time limit 30 seconds).

A. "Use only the crayon you have in your hand."

B. "Don't use more than one crayon."

7. Command giving reason vs. command not giving reason.
Continuation of drawing situation. (Time limit 30 seconds).
 - A. "Use only the piece of paper you have now. We must save the rest for the other children."
 - B. "Use only one piece of paper."
8. Appeal to competition vs. command not appealing to competition.
Continuation of drawing situation. (Time limit 30 seconds).
 - A. "Look at the man that _____ drew. Can you draw a man as well as that?"
 - B. "Draw another ball."
9. Positive suggestion in form of statement of fact vs. positive suggestion in form of question.
Child presented with cutting materials. (Time limit 15 seconds).
 - A. "We are going to cut something out now."
 - B. "Do you want to cut something out now?"
10. Emphasis on immediate objectives vs. emphasis on postponed objectives.
Child given choice of cutting out stenciled ball or feather. (Time limit 30 seconds).
 - A. "If you cut the ball (feather) out, you may take it home today."
 - B. "If you cut the feather (ball) out, you may take it home next week."
11. Praise vs. reproof.
Continuation of cutting out ball or feather. (Time record of performance).
 - A. "You are doing fine with that. You'll soon have it cut out. Keep working on it."
 - B. "You are not doing very well with that. You are not taking pains with it. Keep working on it."
12. Suggestion vs. command.
Child told of red balloons (or toy banks with concealed opening) in sack on table. (Time limit 30 seconds).
 - A. "When I was downtown yesterday I saw some pretty red balloons (funny boxes). I brought two (three) home with me. They are in the paper sack on the table by the window."
 - B. "Bring them over here."
13. Encouragement vs. discouragement.
Child tries to blow up balloon (open box). (Time record of performance).
 - A. "Blow (or open) this one up. It is easy. You can do it."

- B. "Can you blow (or open) this one up? It may be too hard."
14. Emphasis on success vs. emphasis on failure.
Continuation of situation 13. (Time record of performance).
- A. "You almost did it that time."
B. "You haven't done it yet."
15. Positive suggestion in form of statement of fact vs. positive suggestion in form of question.
Child induced to leave scene of experiment. (Time limit 15 seconds).
- A. "We are going downstairs now."
B. "Do you want to go downstairs now?"

Although patterned to a great extent on the Johnson (13) study, the present investigation differs from it in that: (a) intra-child, rather than inter-child control is used; (b) time limits were set within which the positive response must occur; (c) the instructions were given in a continuous conversation rather than in discrete units, and any necessary interpolations so phrased as not to influence the child's response; and (d) two forms of the experiment were given.

RESULTS

Differences were computed between percentages of positive responses made: (1) on the two forms; (2) in response to A and B types of instructions; (3) by subjects familiar and unfamiliar with the examiner; (4) by kindergarten and nursery school subjects; and (5) by boys and girls. In order to determine whether the obtained differences were significant or were simply due to chance fluctuations in the data, each difference was divided by its standard error. When the resulting critical ratios so obtained were greater than 3.0, the differences were regarded as definitely significant. When they were less than 3.0, the differences were regarded as only probably significant.

Differences between forms. Table I presents the percentages, and critical ratios of the difference between percentages, of positive reactions to each instruction on Form I and Form II. In only four cases - 1B, 2B, 10A and 10B, do the ratios exceed 3.00; for items 4A, 7A, 8A, and 13A, they are between 2.03 and 2.35. Most of the other difference ratios are low. Inasmuch as the two forms of the test are virtually identical except for order of presentation, and since 38 of the same subjects took both forms, this finding is, of course, not unexpected.

Differences between A (theoretically superior) and B (theoretically inferior) types of instruction. On Form I, critical ratios in excess of 3.00 between A and B types of instruction were found in all situations except 4, 6, and 11. (See Table III). Differences were in favor of the A type of instruction except in situations 4, 8, 9, 11, and 15. On Form II, differences were significant in situations 4, 8, 9, 12, 13, 14, and 15. In situations 4, 8, 9, and 15, the differences favored the B type of instruction; in situations 12, 13, and 14 the differences favored the A type.

TABLE 1

DIFFERENCES BETWEEN FORMS I AND II IN
POSITIVE RESPONSES TO INDIVIDUAL INSTRUCTIONS

Situation	Percentage of Positive Responses		Diff.*
	Form I(N=61)	Form II (N=54)	S.D. Diff.
Type A (Theoretically Superior) Instructions			
1	96.7	92.5	0.99
2	96.7	92.5	0.99
3	67.2	51.9	1.69
4	45.9	27.8	2.03
5	73.7	74.1	0.51
6	68.9	68.5	0.05
7	96.7	83.4	2.35
8	18.0	35.2	<u>2.09</u>
9	14.8	9.3	0.91
10	83.6	44.5	0.47
11	39.3	44.5	<u>0.57</u>
12	75.4	81.5	<u>0.80</u>
13	67.2	46.4	2.27
14	73.8	87.0	<u>1.83</u>
15	24.6	33.3	<u>1.02</u>
Type B (Theoretically Inferior) Instructions			
1	73.8	94.5	<u>3.25</u>
2	68.9	94.5	<u>3.90</u>
3	27.9	44.5	<u>1.85</u>
4	47.5	64.8	<u>1.39</u>
5	41.0	57.4	<u>1.78</u>
6	54.1	50.0	0.44
7	72.1	79.6	<u>0.94</u>
8	65.6	70.4	<u>0.56</u>
9	77.0	88.9	<u>1.72</u>
10	13.1	50.0	<u>4.58</u>
11	44.3	40.8	0.38
12	21.3	18.5	0.38
13	19.7	7.4	0.99
14	18.0	13.0	0.74
15	59.0	66.6	<u>0.85</u>

*Underlined figures indicate that the difference favored Form II.

TABLE 2

DIFFERENCES BETWEEN TYPE A (THEORETICALLY SUPERIOR) AND TYPE B (THEORETICALLY INFERIOR) INSTRUCTIONS ON FORMS I AND II AND ON THE TWO FORMS COMBINED.

Situation	Percentage of Positive Responses		Diff.*
	Type A	Type B	S.D.-Diff.
<u>Form I</u>			
1	96.7	73.8	3.73
2	96.7	68.9	4.34
3	67.2	27.9	4.71
4	45.9	47.5	<u>0.18</u>
5	78.7	41.0	4.63
6	68.9	54.1	1.70
7	96.7	72.1	4.00
8	18.0	65.6	<u>6.04</u>
9	14.8	77.0	<u>8.76</u>
10	83.6	13.1	11.07
11	39.3	44.3	<u>0.56</u>
12	75.4	21.3	6.95
13	67.2	19.7	5.98
14	73.8	18.0	7.50
15	24.6	59.0	<u>4.08</u>
<u>Form II</u>			
1	92.5	94.5	<u>0.43</u>
2	92.5	94.5	<u>0.43</u>
3	51.9	44.5	0.77
4	27.8	64.8	<u>4.15</u>
5	74.1	57.4	1.85
6	68.5	50.0	1.99
7	83.4	79.6	0.52
8	35.2	70.4	<u>3.92</u>
9	9.3	88.9	<u>13.72</u>
10	44.5	50.0	<u>0.58</u>
11	44.5	40.8	0.39
12	81.5	18.5	8.43
13	46.4	7.4	5.09
14	87.0	13.0	11.39
15	33.3	66.6	<u>3.68</u>
<u>Forms I and II Combined</u>			
1	94.8	83.5	2.86
2	94.8	80.9	3.45
3	60.0	35.7	3.77
4	37.4	55.7	<u>2.86</u>
5	76.5	48.7	4.51
6	68.7	52.2	2.57

TABLE 2 (Continued)

7	90.4	75.7	3.00
8	26.1	67.8	<u>6.93</u>
9	12.2	82.6	<u>15.07</u>
10	65.2	30.4	5.59
11	41.7	42.6	<u>0.14</u>
12	78.3	20.0	10.69
13	57.4	13.9	7.57
14	80.0	15.7	12.46
15	28.7	62.6	<u>5.45</u>

*Underlined figures indicate that the difference favored type B.

When difference ratios between A and B instructions were computed for the two forms combined, significant differences (critical ratios exceeding 3.00) were found in 11 of the 15 cases, and ratios approaching significance in three of the remaining cases. (See Table II). In evaluating these differences, however, it should be remembered that the two forms are reliably different on items 1B, 2B, and 10B. Table II shows that combining Forms I and II produces marked differences in a number of the ratios.

Differences between subjects familiar and unfamiliar with experimenter. No significant differences on individual items were found between Child Welfare subjects (familiar with experimenter) and settlement house subjects (unfamiliar with experimenter). Between Pillsbury subjects and Child Welfare nursery school subjects a critical ratio of 1.63 was found on the total A instructions, Form I; 1.22 on the total B instructions for the same form. On Form II, a critical ratio of .464 was found between Northeast and Child Welfare kindergarten subjects on the total A instructions; a ratio of .553 on the B instructions.

Differences between nursery school and kindergarten children. Because of the small number of children of each age taking each form of the test, critical ratios between the age groups were computed for all A and all B instructions. For the former type, a ratio of .848 was obtained, for the latter, 4.86, both differences favoring the older children. Table III shows the percentages of each age group responding favorably to each instruction.

Sex differences. No statistically significant sex differences were found on either form, though several approached significance. (See Table IV).

DISCUSSION OF RESULTS

Form differences. Differences between forms too great to be due to chance may be explained by (a) differences in order of presentation or (b) change in the type of stimulus material. These children proved significantly more willing to pick up the books in response to a command given at the beginning of the experiment, than they were to pick up the pegs toward the end of the experiment, after having been requested to do so at an earlier stage. Likewise they obeyed a general

TABLE 3

Percentages of Nursery School and of Kindergarten Children Responding Positively to Each Instruction.

Situation	Form I		Form II	
	Nursery School	Kindergarten	Nursery School	Kindergarten
Type A (Theoretically Superior) Instructions				
1	100.0	100.0	86.4	93.9
2	100.0	100.0	86.4	93.9
3	63.6	62.9	40.9	50.0
4	59.1	25.0	22.7	6.3
5	90.9	87.6	68.2	87.6
6	81.8	75.1	50.0	87.6
7	90.9	100.0	77.3	93.9
8	9.1	50.0	13.6	68.9
9	27.3	12.5	18.2	6.3
10	77.3	81.4	40.9	50.0
11	27.3	62.5	54.5	43.8
12	72.7	93.9	86.4	87.6
13	63.6	87.6	68.2	25.0
14	63.6	75.1	95.5	81.4
15	36.4	18.8	54.5	18.8
Type B (Theoretically Inferior) Instructions				
1	77.3	87.6	95.5	93.9
2	59.1	87.6	95.5	93.9
3	36.4	25.0	54.5	43.8
4	36.4	56.3	63.6	87.6
5	22.7	77.6	45.5	68.9
6	36.4	81.4	45.5	62.5
7	50.0	87.6	68.2	87.6
8	59.1	81.4	50.0	81.4
9	63.6	81.4	77.3	93.9
10	18.2	18.8	50.0	43.8
11	63.6	37.6	18.2	56.3
12	18.2	12.5	13.6	12.5
13	18.2	18.8	0.0	12.5
14	22.7	18.8	4.5	18.8
15	63.6	81.4	45.5	81.4

command to put the books away better at the beginning of the experiment than later, after they had previously received the specific command. There is some evidence that age differences affected this finding, since the older children tended to respond equally well in situations 1 and 2 regardless of order of presentation, whereas the younger children tended to respond better to the instruction given first, whether it was theoretically superior or inferior. On item 10B

TABLE 4

Sex Differences in Responses to Each Instruction						
Situation	Positive Responses to Type A Instructions			Positive Responses to Type B Instructions		
	Per Cent		Diff.	Per Cent		Diff.
	Boys	Girls	S.D. Diff.*	Boys	Girls	S.D. Diff.*
Form I						
1	100.0	94.1	1.30	70.3	76.5	<u>0.55</u>
2	100.0	94.1	1.30	66.7	70.6	<u>0.33</u>
3	70.3	64.7	0.47	25.9	29.4	<u>0.31</u>
4	55.6	38.2	1.38	29.6	61.8	<u>2.66</u>
5	81.5	76.5	0.48	48.1	35.3	1.01
6	55.6	79.4	<u>2.01</u>	55.6	52.9	0.21
7	92.6	100.0	<u>1.43</u>	59.3	82.4	<u>2.00</u>
8	14.8	20.6	<u>0.59</u>	55.6	73.5	<u>1.47</u>
9	14.8	14.7	0.01	77.8	76.5	0.12
10	85.1	82.4	0.28	7.4	17.6	<u>1.24</u>
11	40.7	38.2	0.20	44.4	44.1	0.02
12	77.8	73.5	0.39	22.2	20.6	0.02
13	66.7	67.6	<u>0.08</u>	22.2	17.6	0.09
14	74.1	73.5	0.05	18.5	17.6	0.09
15	25.9	23.5	0.22	74.1	47.1	2.25
Form II						
1	93.1	92.0	0.15	93.1	96.0	<u>0.45</u>
2	93.1	92.0	0.15	93.1	96.0	<u>0.45</u>
3	65.5	36.0	2.27	31.0	60.0	<u>2.22</u>
4	31.0	24.0	0.58	55.2	76.0	<u>1.66</u>
5	69.0	80.0	<u>0.98</u>	62.1	52.0	0.75
6	62.1	76.0	<u>1.12</u>	37.9	64.0	<u>1.98</u>
7	79.3	88.0	<u>0.87</u>	72.4	88.0	<u>1.48</u>
8	31.0	40.0	<u>0.6</u>	69.0	72.0	<u>0.25</u>
9	10.3	8.0	0.30	82.6	92.0	<u>0.65</u>
10	41.4	48.0	<u>0.48</u>	51.7	48.0	0.27
11	44.8	44.0	0.06	41.4	40.0	0.10
12	82.8	80.0	0.26	17.2	20.0	<u>0.26</u>
13	62.1	28.0	2.68	6.9	8.0	<u>0.15</u>
14	86.2	88.0	<u>0.19</u>	13.8	12.0	0.20
15	24.1	44.0	<u>1.56</u>	75.9	56.0	1.56

*Underlined figures indicate difference in favor of girls.

the greater percentage of positive responses on Form II may be due to the fact that it is easier to cut out a ball than a feather.

Differences between A and B types of instruction. Significant differences

between the A and B types of instruction on items 1, 2, and 3 of Form I indicate that if the superior type is given first, a request for help is more effective than a direct command; a specific direction is more effective than a general one; and unhurrying directions are preferable to hurrying directions. On Form II, however, where the inferior type of instruction was given first, practically the same percentages of positive responses were elicited by the inferior type as were elicited by the superior type, which was given later. When Forms I and II are combined, the large differences on Form I in favor of the superior instructions are sufficient to produce critical ratios in excess of 3.00.

On items 4, 9, and 15 the inferior form of instruction was given first; the superior was given only if the inferior failed to elicit a response. Except on item 4 of Form I, few subjects failed to respond to the inferior instruction. On item 12, where the superior form was given first and the other form only if the child failed to respond, the first instruction again elicited a response from most of the children. Thus, on these items the desirability of the stimulus offered, rather than the form of instruction, appeared to supply the necessary motivation. On item 5, however, where the inferior type ("Would you like to draw a ball?") was given first and the superior ("The next thing we are going to draw is a big, round ball") was given later, the difference ratio of 4.51 (both forms combined) in favor of the latter would seem to be due to the difference in type of instruction.

The fairly high critical ratios on item 6 (above 1.50 in all three cases) indicate that the positive command ("Use only the crayon you have in your hand") is probably though not certainly more effective than the negative command ("Don't use more than one crayon"). On item 7 the difference between a command giving reason and a command not giving reason is reliable on Form I but low (0.52) on Form II. The lower ratio on Form II may be due to the inclusion of 16 more kindergarten subjects in the group taking this form; for, as Table III shows, the older children tend to respond about equally well to the two forms of instruction in this situation. On item 8, on the other hand, the older children are affected more than the younger by the superiority of instruction A, which is an appeal to competition. (See Table III). Since the younger children out-number the kindergartners 45 to 32, it is probable that the high critical ratios in favor of the theoretically less desirable instruction are due to the age of the subjects.

On Form I and on the two forms combined, significant differences are found on item 10 in favor of the instruction offering immediate reward. On Form II the difference is in the same direction but small. The fact that it is harder for a young child to cut out a feather than a ball probably explains the significant difference between Forms I and II on this item. The coupling of the easier task with the theoretically preferable instruction produced a very high critical ratio (11.07) on Form I.

Standard scores were used in measuring the effects of praise and reproof in situation 11, where the child was timed as he cut out the ball or feather. The small critical ratios indicate that, for the total age range, praise and reproof were about equally effective, though certain age differences were found. (See Table III).

High critical ratios on both forms and on the combined forms were found in situations 13 and 14. These indicate that encouragement is more effective than discouragement and that emphasis on success is more effective than emphasis on failure.

An indication of the reliability of the differences between the A and B types of instruction is the fact that where large critical ratios were found on both forms of the test, the differences were in the same direction.

Differences between subjects familiar and unfamiliar with experimenter. Since no critical ratios in excess of 3.00 were found on any item, it seems reasonable to assume that familiarity or unfamiliarity with the experimenter did not affect the results to any great extent. The experimenter felt that the nature of the child's response was influenced less by the extent to which he was acquainted with her, than by the type of training he was receiving in the nursery school or kindergarten he attended.

Differences between nursery school and kindergarten children. In general, kindergarten children gave more positive responses than younger subjects, both to superior and inferior instructions. On items 4, 9, and 15, where the superior form was given only if the inferior failed, fewer of the older than of the younger children had to be given the second form. Since the number of children of each age taking each form was small, and since the findings were in several instances different on the two forms, generalization concerning individual items is virtually impossible. The relative difficulty of the tasks at the different age levels probably was a factor in some cases, notably in situations 10 and 11 where the child cut out the ball or feather.

Sex differences. Care was taken in planning the experiment to select tasks of equal interest to the two sexes. Since most of the difference ratios were less than 1.00, and only 7 of the 60 ratios on the two forms fell between 2.00 and 3.00 (three were in favor of the boys, four in favor of the girls), it may be assumed that sex did not play an important role in determining responses.

SUMMARY AND CONCLUSIONS

The subjects in this experiment were 39 children from two Minneapolis settlement houses and 38 children from the Institute of Child Welfare of the University of Minnesota. The age range was 27 to 70 months; the mean age for nursery school subjects 43.93 months; for kindergarten subjects 59.28 months. The Institute of Child Welfare subjects were given two forms of the experiment, each settlement house group was given one. On the basis of results found, the following tentative conclusions may be drawn with respect to the age groups studied:

1. Encouragement is more effective than discouragement, and emphasis on success more effective than emphasis on failure at these ages.
2. Ease or difficulty of the task may be more important in determining response than the form of instruction given.

3. Desirability of the task may be more important in determining response than the form of instruction.

4. In a task not intrinsically very desirable (drawing a ball), a statement that the task is to be performed, couched in attractive terms, is more effective than a question as to whether the child wishes to perform the task.

5. The effectiveness of particular types of instruction depends in part on whether the theoretically superior type is presented first or second.

6. In general, older subjects are more likely than younger subjects to respond positively to instructions, whether these are theoretically good or bad.

7. Older children respond more readily than younger to an appeal to competition.

8. Sex does not seem to play an important part in determining the nature of responses to the instructions given.

9. Familiarity and unfamiliarity with the experimenter produce no demonstrable difference in response.

That human behavior is too variable to permit of the formulation of a fixed set of rules for its regulation seems to be indicated by this study. Not only must the personality of the child be taken into consideration, but also the total situation of which he is only a part.

REFERENCES

- (1) Abbott, Jacob. *Gentle measures in the management and training of the young*. New York: Harper Brothers, 1872.
- (2) Anderson, Harold H., and Smith, Ruth S. Motivation of young children: The constancy of certain behavior patterns. *J. Exper. Educ.*, 1933-34, 2, pp. 138-160.
- (3) Blatz, Wm. E., and Bott, Helen. *The management of young children*. New York: William Morrow and Company, 1930.
- (4) Briggs, Thomas H. Praise and censure as incentives. *School and Society*, 1927, 26, 596-598.
- (5) Burnham, William H. *The normal mind*. New York: D. Appleton and Company, 1925.
- (6) Chase, Lucile. *Motivation of young children*. Iowa Child Welfare Research Station Publication, V, No. 3. Iowa City, University Press, 1932.
- (7) Faegre, Marion L., and Anderson, John E. *Child care and training*. Minneapolis: The University of Minnesota Press, 1929.
- (8) Foster, Josephine C., and Headley, Neith. *Education in the kindergarten*. New York: American Book Company, 1936.
- (9) Gates, Georgina Stickland, and Rissland, Louise G. The effect of encouragement and of discouragement upon performance. *J. Educ. Psychol.* 1923, 14, 21-26.
- (10) Gilchrist, Edward P. The extent to which praise and reproof affect a pupil's

- work. *School and Society*, 1916, 4, 872-874.
- (11) Hurlock, Elizabeth B. The effect of incentives upon the constancy of the I.Q. *Pedagogical Seminary*, 1925, 32, pp. 422-434.
 - (12) Hurlock, Elizabeth B. The value of praise and reproof as incentives for children. *Arch. Psychol.* 1924-25, 11, No. 71, 5-76.
 - (13) Johnson, Marguerite Wilker, The influence of verbal directions on behavior. *Child Development*, 6, 3, 196-205.
 - (14) Poffenberger, A. T. *Applied psychology: Its principles and methods*. New York: D. Appleton and Company, 1929.
 - (15) Terman, Lewis M. *The measurement of intelligence: An explanation of and a complete guide for the use of the Stanford revision and extension of the Binet-Simon intelligence scale*. New York: Houghton Mifflin, 1916.
 - (16) Thom, D. A. *Everyday problems of the everyday child*. New York: D. Appleton and Company, 1929.
 - (17) Waring, Ethel B. *The relation between early language habits and early habits of conduct control*. New York: Bureau of Publications, Columbia Univ. 1927.
 - (18) Wylie, Margaret. Experimental study of negativistic behavior in preschool children. 12th Ann. Rept. *Criminology*, 1930, 89-91.

DEVELOPMENTAL SEQUENCES IN NAME WRITING

GERTRUDE HILDRETH¹

Considerable attention has been paid to the spontaneous drawing activities of young children, but their first writing efforts have all but escaped the notice of child psychologists. The probable reason is that writing, much more than drawing, is considered a subject of school instruction. The concept of writing as a developmental process in preschool age children is comparatively new.

Stern (10), Luquet (6), Legrún (5) and Monroe (7) illustrate and describe the young child's early writing efforts, often apparently the result of the child's spontaneous interest in the process, and have called attention to this spontaneous interest as a developmental sign, paralleling the child's mental maturation progress.

One study (2) showed that feeble-minded subjects under a mental age of eight were unable to write their names. Apparently no comprehensive or systematic study has previously been made of the writing efforts of preschool children in successive age ranges who show early interest in writing and develop some skill in the process.

In the course of examining young children under six years of age we have followed the practice regularly of obtaining drawing and writing samples to test motor control, handedness, comprehension of directions and compliance with requests.

When we found in the course of making comprehensive mental examinations of children between the ages of three and six that many of the children seemed eager to write their names on their drawings, we made the name writing exercise a routine part of all examinations of these children. This preliminary, but informal experiment gave convincing evidence that the child's ability to write his name improved steadily from age three to age six without any direct instruction in writing, and that exceptional maturity or immaturity in name writing, apart from direct instruction, was a significant developmental sign. In order to verify this tentative hypothesis name writing data were collected from children in these age ranges more uniformly and systematically.

THE TEST AND THE SUBJECTS

The subjects consisted of all the children between the ages of three and six and a half enrolled or applying for admission over a period of two years' time in a private school in New York City, where the median I.Q. in all grades has for some years remained approximately constant at 120.

Each child was tested individually, the writing exercise coming at the end of a series of tests and games. The request to write usually followed the opportunity to draw. The younger children were given large crayons and large clean sheets

¹From Lincoln School of Teachers College, New York.

of paper. Older children used kindergarten style pencils and were given sheets with lines ruled about an inch apart. Each child was told to write his name and any letters or numbers he could make. He was given all the time he needed and even though he refused at first was encouraged repeatedly to try. In the case of the youngest children who refused, the examiner placed the crayon or pencil in their hands and placed the hand on the paper. If the child still refused, the examiner insisted, "Just pretend you can write". With this procedure the number of children who refused to make any attempt was reduced to a minimum. Ordinarily the child could produce some result in a very short time. Older children were urged to write both first and last names when there was any indication that they might be able to do so. Children who said they knew several ways to write their name were encouraged to demonstrate all styles. Most of the children over four years and a half responded with alacrity, did not consider the request a hardship, and took pride in their achievement. Probably more children could have written their last names but their patience tended to give out before completing the task. Several children recognized their incapacity to write and one honestly commented, "I'll just pretend I can write my name". Only one child of those examined refused entirely to make any kind of mark at all. This was a girl just four years of age.

The children were never shown how to write by the examiner nor helped in the actual writing process. However, many of the children had observed the examiner taking notes and the younger children frequently tried in imitation of the examiner to make hasty, wavy lines across the page. Several had commented to the examiner, "How fast you can write" or "What are you writing?"

The children who could write recognizable letters almost universally wrote in capital letter style or upper case rather than lower case or cursive style. Only four children of all those examined wrote wholly or in part in some other style than printing, and these children were all over six years of age.

The total number of children examined was 170 divided in the following age ranges: 3-3.5, 11; 3.6 to 3.11, 19; 4.0 to 4.5, 19; 4.6 to 4.11, 28; 5.0 to 5.5, 24; 5.6 to 5.11, 25; 6.0 to 6.5, 23; 6.6 to 6.11, 21. Half of the children were boys, half girls.

After the name writing samples were collected, they were arranged by the writer in order of maturity according to several criteria: legible letters, spacing, spelling, evenness and alignment. When the samples within any age level were arranged in order of excellence, considerable overlapping in the samples of any age group with the next was found. The least mature writers in the group 5.0 to 5.5, for example, were not so mature as the best writers in the age group 4.6 to 4.11. This was true of practically every age group for whom samples were collected.

After the samples were arranged in order, the median quality for each group was found by locating the median paper. This paper together with several other samples that clustered about the median were selected as representative of that particular age group.

RESULTS

By the method just described the samples chosen as representative of the median shown in figures 2 to 8 were obtained. Figure 1 shows a sample of name writing response typical of children under three years of age, a sample which may for all practical purposes be considered as representative of the zero level in name writing.



FIGURE 1. NAME WRITING SAMPLE BELOW AGE 3-0

Not all of the improvement shown by the children from age group to age group is indicated in the ratings or in the percentage summary of the data. Improvement was shown in motor control, in ease of adjustment to writing, in willingness to respond, in posture, in use of the writing instrument, in eagerness to write, in pleasure shown in the activity, in speed, ability to write the last name as well as the first without sign of fatigue.

Writing of all the children tested in any age group tended to become more uniform from child to child in the older age groups. Attention span was longer and attention more intense and uniformly maintained in the older age groups. The older children needed less urging, and were more apt to comply with the request to write at the first opportunity. Younger children more frequently commented, "I don't know how", or "My mother never lets me write", more generally ignored the request, or after a brief trial more quickly turned to something else. Often they responded with drawing rather than writing. Older children seemed proud of their ability to write.

At first the child seemed to wish only to imitate the adult's manner in rapid cursive writing, as shown by the hasty scribbling in an up and down motion progressing across the page. At about the four year level the children seemed to have discovered the separate letter units and to be more interested in forming those letter symbols.

Writing the last name came late in the age series and appeared to come rather suddenly. As soon as the first name had been successfully achieved, apparently the last name followed promptly with little difficulty. All the writing was done

by the children in capital letter form.

The improvement from level to level which is shown so graphically in these figures may be described somewhat as follows:

Level I, Figure 2 - Ages 3 to 3-6 years. Something beyond aimless scribbling appears at this level. There is considerable tendency toward the horizontal and some systematic "up and down" scratching, especially in the third sample.

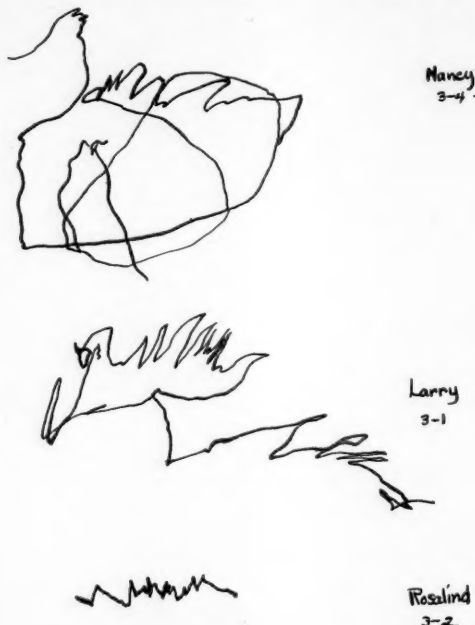
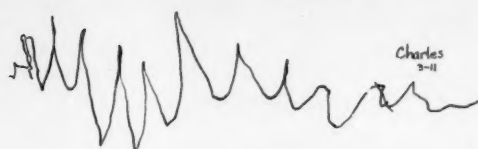


FIGURE II. NAME WRITING SAMPLES AGES 3-0 to 3-5

Level II, Figure 3 - Ages 3-6 to 3-11 years. The chief improvement here is the still greater tendency toward horizontal movement with greater regularity in the vertical strokes. There is some slight tendency to make discrete symbol units, though these are scarcely recognizable as letters.

Level III, Figure 4 - Ages 4-0 to 4-5. Separate symbol units become still more easily discerned. The waviness in imitation of adult cursive writing has almost ceased with the child's new recognition of the separate letter units. Occasionally a simple letter such as H or O is made correctly, but for the most part the letter units are not recognizable as such. There is more constriction in space.

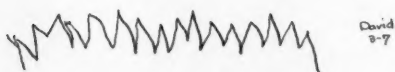
Level IV, Figure 5 - Ages 4-6 to 4-11 years. At this level we find correctly



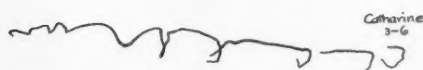
Charles
3-11



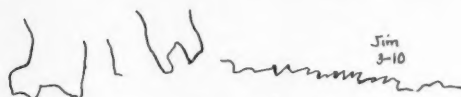
Katherine
3-10



David
3-7

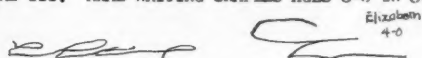


Catherine
3-6



Jim
3-10

FIGURE III. NAME WRITING SAMPLES AGES 3-6 to 3-11



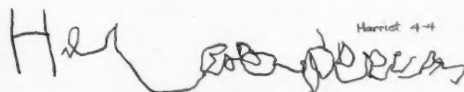
Elizabeth
4-0



Judith
4-4



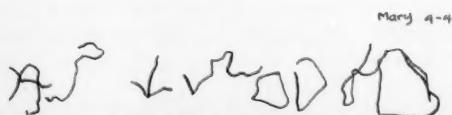
Sam 4-5



Harriet 4-4



Edna
4-3



Mary 4-4

FIGURE IV. NAME WRITING SAMPLES AGES 4-0 to 4-5

ms b7	John 4-6
BBBBBC	Bobbie 4-11
MB	Marcia B. 4-11
ARPI PI MLT	Mary 4-9
qWA	Juan 4-6
VIRI	Virginia 4-7
UAN	Joan 4-11
TDY	Judy 4-9

FIGURE V. NAME WRITING SAMPLES AGES 4-6 to 4-11

formed letters mixed with many incorrectly formed. There is little correct spelling of an entire name, letters are often omitted or rearranged. The letters written do not match the names very closely. This age range is definitely for these children a transition point in writing.

Level V, Figure 6 - Ages 5-0 to 5-6 years. Here we find correct spelling of a first name or nickname, but there are occasional reversals or letter malformations. There is more firmness in control, more regularity, more ease and rapidity shown in writing, and better alignment. The children find more pleasure and fun in writing.

Level VI, Figure 7 - Ages 5-6 to 5-11 years. Improvement in every respect is obvious. There are still occasional letter reversals. The writing from child to

JOHN	John 5-0
HELEN	Helen 5-0
BOBBIE	Bobbie 5-2
ANNE	Anne 5-2
DAVID	David 5-3
RUTH	Ruth 5-3

FIGURE VI. NAME WRITING SAMPLES AGES 5-0 to 5-5

JIMMY	Jimmy 5-8
IRIS	Iris 5-9
JOAN	Joan 5-8
PETER	Peter 5-7
ELINOR	Elinor 5-8
YOUNG	Young 5-8
JACK	Jack 5-9
HELEN	Helen 5-7

FIGURE VII. NAME WRITING SAMPLES AGES 5-6 to 5-11

child is more similar in style and more regular than formerly.

Level VII, Figure 8 - Ages 6-0 to 6-5 years. The chief improvement at this stage is in speed of writing. The consistency of results is surprising considering the small number of cases. Many of these children can also write their last names.

BILL

Bill 6-3

BROOKS

Brooks 6-4

SALLY

Sally 6-4

DONALD

Donald 6-0

LENORE

Lenore 6-0

HENRY

Henry 6-5

FIGURE VIII. NAME WRITING SAMPLES AGES 6-0 to 6-5

Testing beyond this point shows little improvement in capital letter writing. At this point too, school training usually enters to affect the product. There is steady improvement in attitude, speed, rhythm, adjustment, posture, motor control. All the age levels show wide range in writing maturity and there is considerable overlapping from group to group.

Range in intelligence seemed to be a major factor influencing range in quality and writing maturity within any half year age range. The influence of intelligence showed most clearly in extremes of the ability range.

Since these results are typical of children at the different age levels who test on an average of 120 I.Q., the question may be raised concerning results that would be obtained with children of average ability. In the case of average untaught children the chances are large that the same sequential levels in writing maturation would be found as in the case of these more intellectually gifted children. But maturation from stage to stage if not speeded up by formal teaching would undoubtedly take place more slowly. Lacking objective experimental data, the approximate age level at which the present levels would fit average children can be roughly estimated by multiplying each median age for each of the

groups whose results are reported here by 120. The obtained ages for the successive half year intervals beginning with 3-0 are:

3-6	6-0
4-2	6-6
4-8	7-2
5-4	7-8

These results may be considered tentative "norms" until data are obtained for comparable numbers of average children of the same chronological age.

One problem arises in attempting to test average children. That is the "interference" of school training in the case of children over five and a half years of age. By this age many normal children are enrolled in primary classes where instruction in writing, quite regardless of the maturity of the children, is undertaken. In order to make a comparable study children in the older age ranges could only be included who have received no school instruction in writing. At the six year level, particularly, such cases would be difficult to find.

Quantitative summary. Aside from the ratings, an attempt was made to summarize the results quantitatively, by counting the number of letters correctly made that actually occurred in the child's first and last name, at each age level. Only letters correctly orientated were counted correct. It may be objected that such a method of summarizing results would be unfair to particular children whose names were especially long or difficult to spell. Actually this limitation in the method is more apparent than real. Nicknames were usually substituted by the children for their real names when the latter were long, and in counting the final summary, the percentage correct rather than the number of letters correct was used.

Age Level, 3-0 to 3-5 (11 cases)

Scribble only, 5 cases
Scribble, characters or wavy line, 3
Circle, 1
Characters, 2

Age Level, 3-6 to 3-11 (19 cases)

Scribble only, 3
Scribble and characters or wavy line, 8
Separate characters, one or more, 7
Straight line, 1

Age Level, 4-0 to 4-5 (18 cases)

Refuses, 1
Wavy line, scribbles and characters, 8
Characters, 3
One letter correct and seven separate characters, 1

Age Level, 4-0 to 4-5 (18 cases) - Continued.

Correct letter formation, 100% - 2 cases
 80% - 1 case
 20% - 2 cases

Age Level, 4-6 to 4-11 (28 cases)

% correct	No. of cases	Last Name
100	7	
80	1	No - 25 cases
75	2	In part - 3 cases
66 2/3	1	
60	1	
50	6	
16 2/3	1	
0	9	

Age Level, 5-0 to 5-5 (24 cases)

% correct	No. of cases	Last Name
100	15	
80	1	No - 18 cases
75	1	Yes - 2 cases
43	1	In part - 4 cases
30	1	
12 1/2	1	
0	4	

Age Level, 5-6 to 5-11 (25 cases)

% correct	No. of cases	Last Name
100	17	
83	1	Yes - 8 cases
75	2	No - 15 cases
50	1	
16 2/3	2	
12	1	
0	1	

Age Level, 6-0 to 6-5 (23 cases)

% correct	No. of cases	Last Name
100	16	
87	1	Yes - 8 cases
80	2	No - 15 cases
75	1	
50	1	
33	1	
16	1	

Age Level, 6-6 to 6-11 (21 cases)

% correct	No. of cases	Last Name
100	19	Yes - 16
14	1	No - 4
0	1	In part - 1

INFLUENCE OF TRAINING FACTORS

Variations from child to child in the different age levels is unquestionably due in part to differential training factors. In general the groups tested were fairly homogeneous with respect to economic status, social background, parental intelligence. These children come from the types of homes where A.B.C. blocks and books are commonplace, where children see the writing process carried on, where questions about writing and demands to write are intelligently answered.

In conversation with parents the response was quite general that when the children reach a certain stage in their maturity, they become interested in the writing process and make inquiries about it. They reach the point in their development where they very much want to imitate the adult's writing activities. They show insight and autocriticism of their own immature efforts and strive to improve. Improvement that results from this inner urge which is largely the result of maturation in a literate environment is fast or slow depending upon the child's learning ability, the interest he takes in the process, the stage of maturation he has reached when this interest is shown and the help he gets in recognizing and correcting his errors.

Parents generally reported that they had ordinarily answered the child's questions and given instruction when it was demanded but ordinarily had not wished the child to learn to read and write at an early age. No doubt the results for groups of less favored children would be analogous so far as serial order of learning as indicated by the name writing is concerned, but the various stages of progress would not appear so early in the child's career.

Parents questioned about the children's interest in writing almost universally commented that they had not taught the children to write, that on the contrary they had more often tried to discourage them from writing when they saw the amount of time being consumed in the exercise.

Apparently these children acquired their writing accomplishment by begging to know how to write when seeing others writing, and in response to the parent's suggestions as to how to form letters and to spell their names. Few of the children were apparently greatly embarrassed by their errors or recognize them fully before five and a half years of age. Name writing results from the child's interest in practicing, not solely from the child's being told how to do it. Parents reported that the children spent hours writing, but results were often unintelligible.

In explaining results the argument might be offered that increment in skill with age is solely the result of increasing amounts of instruction. There is no

evidence in favor of this argument at least until the age level of five and a half is reached and it is improbable that children are given more instruction in name writing at age four and a half than at age three. There is evidence however that the children increasingly practice writing through the preschool years and that as they mature they demand more help from their elders in achieving skill in writing.

The present study suggests others that could profitably be undertaken with children of preschool age:

- Sex differences in writing at these ages.
- Lateral orientation in beginning writing.
- Relation of handedness to skill and orientation.
- Relation of intelligence to handwriting quality within a narrow age range.

APPLICATIONS

The results, though highly tentative, lend themselves to two practical applications:

First, name writing in appropriate age levels may be used along with drawing, block play and other informal performance tests in evaluating the mental status of the subject. It constitutes a satisfactory non-language performance test. Writing constitutes a good motor and perception test among children who have had similar opportunities to observe and practice the writing of number and letter symbols. Barring special training involving regular and closely supervised practice, the extent to which the child below six years of age is able to write his name is an indication of mental maturity. Maturation in name writing parallels speech refinement, refinement in perception, improvement in drawing, and number ability that occurs between the ages of three and six.

The norms to be used as reference points for evaluation of writing would be the converted ages reported above, rather than the median results for gifted children.

In interpreting results for purposes of mental diagnosis, evaluation of intellectual abilities and mental maturity, it is important to take the training factor into consideration. To do this it is usually necessary to inquire of the parent how much interest the child has shown in writing, what his opportunities to write have been, and what the parent's response has been to the child's request to write; whether the child has had formal writing instruction in school classes or with teacher at home.

In the second place, the results suggest the importance of knowing something about the child's writing maturity before formal instruction is given. We may assume that children of six who have barely reached the second or third stages pictured in the graphs deserve a somewhat longer exploratory period with pencil and paper, letters and numbers before formal writing especially in cursive style is begun. Since children invariably write in capital letter style before they

receive formal instruction and achieve a high degree of skill in this writing style, it would be logical to continue with print script (lower case letter) style for a period of time before cursive writing is taught. By this means better continuity between the child's first primitive writing efforts and more mature writing stages would be maintained. Preservation of this continuity would seem to be essential in maintaining the child's interest in writing and in contributing to his general school adjustments. Instruction could thus proceed more effortlessly and the children respond more spontaneously than they now do when first taught "penmanship".

REFERENCES

- (1) Biber, B. Children's drawings: From lines to pictures. Bureau of Educational Experiments, New York: 1934.
- (2) Gordon, H. Left-handedness and mirror writing. *Brain*, 1920, 43, 313-368.
- (3) Hildreth, G. H. The success of young children in letter and number construction. *Child Development*, 1932, 3, 1-14.
- (4) Hornig, R. Zeichen- und Schreibphänomene bei Elementarschülern. *Ztschr. f. Angew. Psychol.*, 1910, 3, 541-545.
- (5) Legrün, A. Wie und Was "geschrieben" Kindergartenzöglinge. *Ztschr. f. pädagog. Psychol.*, 1932, 33, 322-331.
- (6) Luquet, G. H. *Les dessins d'un Enfant*. Paris: Felix Alcan, 1913.
- (7) Monroe, M. The drawings and color choices of young children. Abstracts of theses, Humanistic Series, University of Chicago, 1928-1929, 7.
- (8) Montessori, M. The Montessori method. New York: Stokes, 1912. Chapters 16 and 17.
- (9) Neitz, M. Namewriting of kindergarten children. Master's essay, Northwestern University, 1933.
- (10) Stern, W. *Psychologie der Frühen Kindheit*. Leipzig: Quelle und Meyer, 1930 (6th ed.), 147-149.

RORSCHACH TEST NORMS OF YOUNG CHILDREN

DAGNY SUNNE¹

As it becomes increasingly clear that learning depends fundamentally on personality as well as on intelligence, it seems important to ascertain how early such traits can be established, what different forms they assume, and how teaching must be adapted to these variations in order to make acceptable achievement less difficult and less hampered by individual peculiarities. These investigations of young children utilize the common forms of intelligence and performance tests and also the personality measurements adaptable, especially the Rorschach Diagnostik. This latter test can be used with precocious 2-3 year old children and with average children as early as 4-5 years. It is helpful with youngsters who are negativistic, since they are more willing to give verbal responses to these unusual pictures than to any other test-material. This test is also an instrument for demarcating intelligence from verbosity and verbal fluency. It is, furthermore, an aid in revealing the unusual cases of creative imagination where intelligence and performance scores are only average or even inferior. Moreover, it might be worthwhile to investigate whether a technique which discloses the factors involved in an ill-balanced adult personality could indicate early in the life of children the beginnings of such unfavorable tendencies. If it were possible to differentiate in childhood between neurotic and psychotic trends, more definite methods of remedy might be found. Finally, in such studies of young children there might be suggestions for wider observations and an answer to the question as to stable personality patterns. The immediate objective of this inquiry is to find norms that can be utilized for further comparisons between different social-racial groups. This report gives the general statistical results of the Rorschach test administered to 3 groups of children of different social status and more detailed analysis of the Rorschach Form, considered as form-perception, one of the 4 psychological processes constituting personality according to this test. This point of view has been so ably elaborated by Dr. S. J. Beck (*Am.J. of Psychiatry* XIII, 3, 1933) that there is no need of discussing it here.

The 3 groups that furnished the data for these results were distributed as follows: 1655 White Children (871 boys and 784 girls) and 2068 Negro children (1042 boys and 1026 girls) were pupils in Nursery, Kindergarten and First Grade in New Orleans; 712 Southern Mountain children (339 boys and 373 girls), all primary pupils. The proportion of overage Mountain children in the first grade was so much larger than in the other two groups that the siblings in all the primary grades were included in order to note possible effects of more extensive schooling. In recent government publications issued by Everett Edwards of the Department of Agriculture it is asserted that "there are at least 3 distinct social classes in the Southern Appalachian region. One group is found in the valleys of the creeks and rivers where the soil is comparatively rich, the water supply satisfactory, and communication relatively easy...The second group lives along the streams where the valleys are narrower, the hills higher and steeper, and the soil poorer and thinner." The third group are the Cove people, living "where slopes are steepest

¹ Andrews, North Carolina.

and soil poorest." The Mountain children discussed in this report belong predominantly to the two less favored groups. On account of the many opportunities offered by an urban environment to offset deficiencies of meagre home training, a lack which in the Mountain community is partially supplied by the school, the second division of overage children (8 year-plus in the tables) are the pupils who have had several years of schooling in the primary grades.

The mental ages obtained from both Stanford Revision and Yerkes Point Scales indicate according to the means fairly similar intelligence levels for the majority of the children in each of the 3 groups tested. The results given under MAN are ages from the Goodenough scale and the ratings of the Mountain group are lower at all year-levels than those of the other groups. This group also ranked lower on the performance tests, but the results are too varied to be summarized in a brief statement. When the children are given the opportunity of trying out the whole Yerkes scale as far as they can, the scores are consistently higher at all year-levels in all 3 groups than those from the Stanford Revision.

TABLE I

The mean scores for chronological age, mental age by Stanford Revision - M.A.-S and Yerkes Point M.A.-Y, Goodenough Drawing of Man Scale M.A.-G and the Rorschach scores. M - movement. C - color. Cs - specific colors. Ar.Spat. - spatial features in noun forms. Ar. - constructional forms. O - objects. Os - minor categories.

Mental Age					Rorschach							
No.	C.A.	M.A.-S	M.A.-Y	M.A.G	Av.Range	M	C	Cs	Ar,Spat.	Ar.	O	Os
White Boys												
171	4-7.3	5-4.6	5.5	4-11	45.9(13-74)	1.6	2.3	3.1	5.1	2.1	1.5	9.3
375	5-6	6-2	6.1	5-11	55.4(13-102)	1.8	2.4	3.5	5.9	1.7	1.3	10.9
221	6-5	6-11	7.6	6-3.3	58.6(26-122)	2.0	2.9	5.0	7.9	1.7	1.1	11.9
56	7-4.7	7-0	7.4	6-5.6	55.7(35-94)	1.4	3.3	4.9	8.5	1.4	0.8	11.3
48	11-0	8-6.8	8.8	8-0	57.7(25-95)	1.4	2.0	3.0	6.3	1.0	0.5	11.3
White Girls												
145	4-6.6	5-4	5.6	5-3	46.0(22-83)	1.4	2.4	4.6	5.8	1.9	2.1	10.6
356	5-5.2	6-1.7	6.5	6-0	55.1(17-110)	1.6	2.4	4.5	6.2	2.0	1.0	11.1
209	6-4.5	6-6	7.0	6-1	53.4(22-130)	1.6	2.8	5.1	6.7	1.7	1.1	11.1
29	7-4.1	7-0	7.8	6-9.5	58.3(33-83)	1.4	2.5	3.1	10.2	2.4	0.5	15.2
45	10-4	8-2	8.9	7-9.6	58.1(22-130)	1.0	2.9	5.4	8.0	1.0	1.0	10.8
Negro Boys												
28	4-8.9	5-1	5.3	5-4.6	42.8(21-74)	1.4	2.4	3.8	4.0	1.9	1.9	7.2
237	5-7	5-11	6.1	5-7.1	55.1(24-101)	2.1	2.8	4.9	7.8	1.8	2.1	10.7
364	6-5.6	6-1.8	6.6	6-1	54.9(17-112)	1.8	3.1	5.2	7.8	1.8	1.4	9.5
246	7-4.6	7-0	7.1	6-5.6	59.1(25-103)	2.2	2.9	4.8	7.5	1.4	1.4	8.1
167	9-0	7-5	7.7	7-2	62.8(21-118)	2.2	2.9	4.8	8.6	1.2	1.0	6.2

That is, the girls tend to respond with a slightly larger proportion of the minor categories than do the boys.

TABLE II

Mean Scores for Rorschach Form Categories - Ar. - architectural. C - color. P - personalities. A. - animals. At. - anatomical. Nat. - nature. App. - apparel. Hld. - household. Imp. - implements. Verb. - verbal. Sch. - school. V. - vehicles. Mt. - Mountain.

Ar. C. P. A. At. Nat. App. Spat Hld. Imp. Food V. Toy Sch. Verb Totals

White Boys

1.1	0.4	1.7	7.7	2.6	4.9	0.5	0.45	0.2	0.2	0.15	0.1	1.1	0.08	0.05	20.4
0.6	0.3	1.6	8.5	3.3	5.4	0.6	0.6	0.26	0.25	0.2	0.1	0.1	0.1	0.1	22.9
0.5	0.3	1.5	8.3	4.7	5.1	0.7	0.2	0.2	0.2	0.1	0.1	0.05	0.1	0.1	22.5
0.3	0.1	1.8	8.2	4.5	5.3	0.35	0.8	0.1	0.2	0.05	0.04	0.1	0.02	0.1	21.8
0.4	0.1	1.2	1.4	5.1	4.3	0.3	1.5	0.2	0.1	0.1	-	0.1	0.1	0.1	25.8

White Girls

1.0	0.5	2.1	8.8	2.8	5.0	0.6	0.35	0.2	0.15	0.3	1.1	0.15	0.05	0.1	22.5
0.9	0.5	1.8	9.3	3.6	5.5	0.9	0.8	0.26	0.2	0.2	0.03	0.1	0.1	0.2	23.8
0.55	0.5	1.7	8.3	0.4	4.25	0.7	0.8	0.3	0.1	0.3	0.05	0.1	0.01	0.2	21.8
0.5	0.2	2.1	9.3	3.9	5.1	1.0	1.2	0.3	0.2	0.1	-	1.1	0.03	1.7	24.2
0.3	0.4	2.4	8.5	6.3	3.6	0.7	0.8	0.2	0.2	0.1	-	0.1	0.02	1.9	23.8

Negro Boys

1.0	0.2	2.0	7.5	1.8	4.6	0.6	0.3	0.3	0.5	0.25	0.1	0.1	1.4	-	19.2
0.9	0.3	2.9	8.4	3.8	6.8	0.75	1.04	0.4	0.4	0.3	0.13	0.24	0.1	0.1	26.6
0.7	0.2	2.2	7.7	3.8	6.6	0.6	1.0	0.3	0.3	0.2	0.1	0.13	0.04	0.1	24.0
0.6	0.1	2.4	8.1	5.1	6.6	0.6	1.1	0.3	0.25	0.2	0.1	0.13	0.04	0.1	25.5
0.4	0.25	2.8	9.1	6.4	6.1	0.5	1.0	0.2	0.3	0.13	0.1	0.04	0.1	0.1	27.9

Negro Girls

0.8	0.15	2.5	6.9	2.7	7.5	0.9	1.4	0.3	0.2	0.6	0.03	0.03	0.03	-	24.0
1.0	0.3	2.8	7.4	4.1	6.3	0.9	1.0	0.6	0.3	0.4	0.06	0.2	0.07	0.14	25.4
0.6	0.25	2.3	7.6	5.0	6.4	0.8	1.4	0.35	0.24	0.24	0.6	0.15	0.05	0.1	25.4
0.45	0.23	2.6	8.0	5.1	6.4	0.8	0.9	0.4	0.2	0.3	0.02	0.1	0.02	0.1	25.6
0.5	0.2	2.4	8.4	6.3	6.5	0.65	1.1	0.3	0.2	0.06	0.01	0.1	0.03	0.1	26.8

Mountain Boys

0.4	0.05	1.9	8.7	8.8	7.5	0.4	1.1	0.13	0.15	0.26	0.1	0.1	0.05	0.05	29.6
0.35	0.1	1.8	9.2	9.3	7.1	0.5	1.3	0.5	0.3	0.1	0.1	0.1	0.1	0.1	31.2
0.4	0.14	2.5	7.8	10.3	9.4	0.6	1.3	0.4	0.1	0.2	0.1	0.04	-	0.01	33.2
0.5	0.2	2.7	9.5	12.2	8.5	1.1	1.6	0.5	0.1	0.1	0.1	0.04	0.02	0.1	37.5

TABLE I (Concluded)

No.	Mental Age				Av. Range	M	Rorschach						
	C.A.	M.A.-S	M.A.-Y	M.A.-G			C	Cs	Ar, Spat.	Ar.	O	Os	
Negro Girls													
34	4-8.4	5-7.4	5.4	5-1	48.8(23-82)	1.03	3.2	5.1	6.8	1.9	2.2	10.1	
263	5-7.7	6-0	6.3	5-8	61.2(25-117)	1.9	3.3	6.3	9.0	2.1	1.8	9.7	
344	6-5.6	6-5	6.6	5-9.5	58.5(27-132)	1.7	3.2	5.7	8.2	1.6	1.7	10.4	
226	7-4.8	6-10	7.1	6-5	57.8(30-97)	1.7	3.0	5.2	7.5	1.3	1.4	9.8	
159	9-0	7-0	7.6	7-0	64.4(25-119)	1.7	2.3	4.3	8.1	1.2	1.2	9.0	
Mountain Boys													
7	5-11	5-8	6.2	5-4	51.7(22-85)	1.0	3.0	4.0	8.2	1.7	0.3	10.0	
54	6-6	6-3	6.6	6-4	65.0(28-152)	0.9	2.3	3.2	6.2	1.2	0.4	9.3	
71	7-5	6-4	7.3	6-8	69.1(31-126)	1.2	2.8	4.3	6.8	1.1	0.5	11.1	
87	10-0	7-6	7.9	6-9	72.5(26-121)	1.1	2.4	5.2	7.1	0.9	0.6	9.9	
126	10.7	8-9	9.1	7-3	85.1(28-143)	1.3	2.5	3.8	7.2	1.4	0.6	12.4	
Mountain Girls													
8	5-9	5-7.5	6.1	5-4	55.9(30-84)	0.8	2.9	4.3	4.8	2.1	1.5	9.8	
63	6-6	6-4	6.6	6-1	64.0(30-110)	1.2	2.9	5.4	8.7	1.4	1.1	12.9	
72	7-9	7-6	7.4	6-4	67.9(33-118)	1.1	2.5	3.7	8.4	2.2	0.6	11.2	
70	9-0	7-7	8.1	6-8	69.6(22-127)	1.1	2.2	3.8	7.3	1.4	0.3	9.8	
167	10-6	8-9	9.2	7-9	82.5(26-159)	1.6	2.7	4.2	10.7	1.5	0.8	14.1	

As far as possible the Rorschach categories were retained but others had to be added to make the summary complete and some changes were made to give due emphasis to individual variations that seem significant. In all the groups 3 large classifications are outstanding: Animals (A.), Anatomical parts (At.), and Nature (Nat.). The term "Botanical" is of little use; less than a half dozen trees were specifically named in any of the groups, and rose was the only flower mentioned several times and dahlia and lily each once. If every idea suggested by the pictures is counted only once, irrespective of the number of times it is given by the same child or by many children, these 3 classes comprise from 79% to 91% of all the individual ideas (White group 909; Negro 871; Mountain group 566). The lowest percentages belong to the Negro 4-5 year-olds, and the highest to the first grade 8+ year Mountain children. In other words, from the standpoint of variety of categories, the former are the most original and the latter the least. There is a consistent tendency for the girls at all ages in every group to have smaller percentages than the boys by even larger amounts than are indicated in the following summary:

All Boys	All Girls	Totals
White 87% Negro 85.3% Mt. 88.6%	White 84% Negro 84% Mt. 87.1%	B. 86.5% G. 85.7%

TABLE II (Concluded)

Ar. C. P. A. At. Nat. App. Spat Hld. Imp. Food V. Toy Sch. Verb Totals

Mountain Girls

0.4	0.2	2.1	7.3	7.5	8.3	0.7	1.3	0.5	0.13	0.1	0.1	0.1	-	0.14	29.2
0.7	0.5	2.2	7.6	9.0	8.5	1.2	1.2	1.4	0.24	0.15	0.15	0.1	0.2	0.1	32.3
0.4	0.14	2.5	7.8	10.3	9.4	0.6	1.2	0.4	0.1	0.17	0.13	0.04	-	0.01	33.2
0.5	0.23	2.7	9.5	12.2	8.5	1.1	1.6	0.5	0.1	0.13	0.01	0.04	0.02	0.1	37.5

In the tables color (C.) indicates in how many pictures each child mentioned color, including blood, fire and similar equivalents. Colors specifically named, each color mentioned counted only once for the same picture, irrespective of how many parts were so described, are designated Cs. The abbreviation Ar. stands for architectural and constructional masses and materials and Spat. for such spatial features as line, stripe, hole, given in noun-form so that this category conforms strictly to the others. When interpretation of the results was attempted, it was found that spatial relations expressed in prepositional phrases had great significance and hence these were also taken into account in arriving at the final scores. From observation of the children and reports of their behavior as well as from the other tests, these Ar.-Spat. categories seemed empirically, at least, to be an index of personality, so more detailed tabulations have been set forth.

It seemed impossible to determine whether from the children's standpoint such beings as St. Claus, Giant, Elf, Deity should be regarded as human or not, so all these and similar personifications and proper names as well as humans are included in the abbreviation P. All kinds of apparel come under App., and ordinary objects of the household under Hld. All other implements and instruments have been classed as Imp. Food covers drinks as well as eats, and all kinds of vegetation known to the children principally as eatables are placed here instead of under Nature. The category vehicles (V.) has the special interest of perhaps showing some bearing of automobiles and airplanes on the form-perception of different children. Objects that the children come in contact with only or mainly in school are listed as Sch. and responses as picture, ink, puzzle are called verbal. Excluding the 3 major categories together with C. and P., these 10 minor categories that make up a very small percentage of the totals, have been combined under the term O's, so that comparison can be made without the handicap of local differences and personal idiosyncrasies which may make the determination of the exact categories ambiguous or impossible.

As far as possible, the experience and meaning implied by the children were the criteria of the classification. To the urban groups, brush is an implement; to the Mountain children a familiar part of nature. To the former, knob is a part of a door; to the latter, a part of a tree or of a mountain. The city children buy a snowball at the counter, the Mountain boys and girls make theirs when the snow falls. On the other hand, the same stuff is tallow for the Mountain children and wax for the Negro. It is also disconcerting to get such terms as scorpion, tonsils, brains, and entrails as equally frequent responses from Mountain young-

sters and from Negro and to hear that germs are seen in the picture by 5 year-olds, both Negro and White. Of the total number of individual responses given by these children, the Mountain group contribute 114 words not used by either of the other groups, the White 149, and the Negro 176.

A striking feature of the Rorschach test is the close similarity at all year-levels of the means of the majority of categories, the experimental coefficient of unreliability ranging from 0 to 32 in most cases. The same patterns occur from the fourth year on thru the different chronological and mental ages, and a considerable number of retests indicate a stability of these patterns as great as that of the I. Q. The responses from the earliest ages of testing take the forms of all the major and most of the minor categories. There is an increase in the sum total of responses, according to age, both in amount and range, but it is doubtful that the number of individual ideas contributed increase at the same pace. There is a tendency toward greater wordiness on the part of the older children and a repetition of the same idea thruout the whole series. Exaggerated verbosity and repetition is to a larger extent characteristic of the Mountain children, even of the youngest as can be seen from the large totals and the small number of individual ideas. Responses of Movement, Color, and Spatial Relations increase with age, and 'particularly responses of Anatomical Parts.' This is also the one category where the difference between the Mountain children and the other groups is definitely valid statistically. Even in the case of individual ideas, this category furnishes 14% of the total for the Mountain group as compared with 8% for the Negro and White. In the whole series less than 8% of the Mountain group omit mention of some anatomical or physiological aspect, but over 18% of Negro and White make such omission. One half or more of all the responses given belong to this category in 15-20% of the Mountain group, but in only 2% of the White and Negro. On the other hand, less than 3% of all the groups omit mention of animals, and about 7% of nature. Less than one third of the White and Negro children omit movement, 40-50% of the Mountain; about 25% of the latter give no Color response, about 20% of the White, and approximately 15% of the Negro children. It is also of interest that many of the Movement responses of White and Negro children are play activities, while no such reference occurs in the Mountain group.

The major categories, Animals and Nature, have been selected for analysis of distribution, as the latter illustrates the concentration upon one outstanding item while in the former the frequencies are somewhat more evenly distributed among the different animals; the third major category (At.) conforms to this type also. The percentages were calculated on the total of the selected items rather than on the whole category total, since it was assumed that thus a comparison fairer to all the groups could be achieved. As usual the sex differences are dubious: a slight trend for the boys to favor bear and the girls to prefer dog and rabbit. There is a tendency for bear and snake to become more frequent with increasing age, and for cat, cow, dog, horse, monkey to become less so as they are replaced by a greater variety of animals with the maturing experience and discrimination of the children. As to the different groups, all 3 agree on giving most often, tho with varying emphasis, butterfly, dog, rabbit, bird and bear, while the Negro group is peculiar in the greater frequency of cat as well as of dog. On account of the many animals mentioned only once or twice, it is futile to attempt a summary of those of least frequency.

TABLE III

Ar.	c.	P.	A.	At.	Nat.	App.	Spat.	Hld.	Imp.	Food	V.	Toy	Sch.	Verb.
-----	----	----	----	-----	------	------	-------	------	------	------	----	-----	------	-------

White Boys

5.0	2.1	8.0	37	13	24	2.5	2.2	1.1	1.0	0.7	0.6	0.5	0.3	0.2
3.0	1.4	7.0	36	15	24	3.0	3.0	1.2	1.2	0.8	0.3	0.5	0.3	0.4
2.2	1.2	7.0	37	21	23	2.2	3.0	0.7	0.8	0.8	0.3	0.3	0.2	0.3
1.4	0.3	8.5	37	20	25	1.6	3.7	0.4	1.0	0.2	0.1	0.4	0.1	0.4
1.6	0.5	8.5	44	19	17	1.0	4.0	1.0	0.5	0.5	-	0.3	0.5	0.5

White Girls

4.4	2.3	10.0	39	13	23	1.6	1.6	0.9	0.7	1.4	0.4	0.7	0.25	0.6
4.0	2.0	7.6	39	15	21	3.6	3.4	1.1	0.8	0.7	0.01	0.5	0.3	0.6
2.5	2.0	8.0	38	18	19	3.4	3.5	1.4	0.5	1.2	0.2	0.4	0.1	0.8
2.0	0.1	9.0	36	16	21	4.2	5.5	1.1	1.0	0.1	-	0.1	0.1	1.1
1.0	1.6	10.0	36	27	15	3.0	3.5	1.0	1.0	0.3	-	0.3	0.1	1.0

Negro Boys

5.0	1.2	10.0	39	9.3	24	3.0	1.5	1.5	2.6	1.3	0.1	0.1	0.1	-
3.3	1.0	11.0	32	15	26	3.0	4.0	1.5	1.6	1.1	0.5	0.9	0.3	0.2
3.0	0.9	9.3	32	16	28	2.6	4.0	1.2	1.2	0.9	0.4	0.6	0.2	0.3
2.4	0.4	9.5	31	20	26	2.2	4.0	1.0	1.0	0.7	0.3	0.3	0.4	0.5
1.5	0.9	10.0	33	23	22	2.0	3.5	0.7	1.0	0.5	0.3	0.2	0.33	0.3

Negro Girls

3.6	0.5	10.3	28	11	31	4.0	6.0	1.3	0.8	2.5	0.1	0.1	0.1	-
4.0	1.2	11.0	29	16	25	3.3	3.8	2.2	1.5	1.6	0.2	0.7	0.3	0.5
2.3	1.0	9.0	29	20	25	3.3	5.5	1.4	1.1	1.0	0.24	0.6	0.2	0.3
1.7	0.9	10.0	31	20	25	3.0	3.5	1.6	0.5	0.9	0.1	0.5	0.1	0.3
2.0	0.7	9.0	31	23	24	2.3	4.0	1.0	0.8	0.2	0.1	0.2	0.1	0.2

Mountain Boys

0.3	0.2	4.4	29	30	25	1.4	3.6	0.5	0.5	0.8	0.3	0.3		
1.1	0.4	5.7	29	29	22	1.7	4.2	1.7	0.7	0.4	0.2	0.2	0.2	0.2
0.8	0.2	7.0	23	35	24	2.2	4.5	0.5	0.3	0.8	0.2	0.1	0.1	0.1
1.2	0.4	6.0	24	35	22	1.4	6.0	0.8	0.8	0.4	0.1	0.1	0.1	0.4

Mountain Girls

1.3	0.7	7.0	25	26	28	2.0	4.5	1.8	0.4	0.5	0.3	0.2	-	0.5
2.3	1.5	7.0	24	28	27	3.7	5.0	0.7	0.5	0.4	0.3	0.5	0.1	0.3
1.3	9.4	7.6	24	32	29	2.0	3.6	1.0	0.3	0.5	0.4	0.5	-	0.1
1.4	0.6	7.0	26	33	23	3.0	4.0	1.3	0.3	0.3	0.1	0.1	0.1	0.2

TABLE IV

Percentages of total Rorschach scores for animals named most frequently.

	Boys			Girls			Total		
	White	Negro	Mountain	White	Negro	Mountain	Boys	Girls	Group
Bat	1.0	0.5	3.3	0.8	0.1	2.3	1.1	0.8	1.0
Bear	11.0	5.5	12.5	9.5	3.0	10.0	8.6	6.4	7.6
Bee	2.8	0.8	1.0	2.8	1.0	1.3	1.6	1.6	1.6
Bird	11.0	7.0	9.3	12.0	7.0	7.0	9.0	8.8	9.0
Bfly.	27.0	18.0	21.0	24.0	18.0	24.0	22.0	21.0	22.0
Cat	2.5	6.0	4.7	4.5	8.0	5.0	4.5	6.1	5.3
Chicken	3.3	4.4	3.3	2.2	4.0	5.2	3.8	3.5	3.7
Cow	1.1	1.8	1.0	1.0	1.3	1.3	1.4	1.2	1.3
Crab	4.2	5.0	0.6	4.0	5.0	0.4	4.0	4.0	4.0
Crawfish	1.0	0.7	1.7	1.3	1.0	1.2	1.0	1.1	1.0
Dog	8.7	16.5	11.0	12.0	17.0	11.0	13.0	13.0	13.0
Horse	2.6	5.4	2.0	2.6	5.0	2.5	3.8	3.7	4.0
Monkey	4.7	5.1	2.0	5.4	6.4	1.3	4.4	5.1	5.0
Rabbit	6.2	10.0	12.0	8.8	9.4	11.0	8.9	9.3	9.0
Rat	5.6	5.0	4.0	3.0	5.0	2.7	4.6	4.0	4.3
Snake	3.8	5.2	5.0	4.3	3.7	5.5	4.6	4.2	4.5
Spider	3.2	3.2	2.7	1.7	2.8	2.8	3.0	2.3	2.7
Squirrel	1.0	0.9	3.2	0.8	0.6	3.2	1.3	1.2	1.2

TABLE V

Percentages of total Rorschach scores for nature items named most frequently.

	Boys			Girls			Total		
	White	Negro	Mountain	White	Negro	Mountain	Boys	Girls	Group
Air	1.0	1.2	0.3	0.5	1.0	0.5	0.9	0.7	0.85
Branch	1.0	1.2	0.7	1.0	0.5	0.7	1.1	0.7	0.9
Cloud	6.0	7.0	12.0	4.0	5.0	11.0	7.8	6.0	7.0
Dirt	6.3	1.7	0.7	2.0	0.9	0.1	1.9	1.0	1.4
Fire	13.0	6.3	6.7	9.0	7.5	6.0	8.5	7.7	8.0
Flower	10.0	7.0	6.3	10.0	8.7	6.8	7.7	8.8	8.0
Grass	1.3	1.0	1.0	1.5	1.0	1.4	1.2	1.2	1.2
Ground	1.6	1.6	1.5	1.0	1.3	1.7	1.6	1.3	1.5
Ice	0.5	0.3	0.7	0.7	0.2	0.6	0.5	0.4	0.45
Leaf	3.0	5.5	8.0	2.0	5.4	7.0	5.5	5.0	5.1
Limb	0.3	1.0	8.0	0.5	0.8	7.0	2.1	2.0	2.1
Moon	1.0	1.2	0.3	1.4	2.0	0.8	1.0	1.6	1.3
Rain	0.5	0.2	0.1	0.7	0.2	0.2	0.3	0.4	0.4
River	0.3	0.2	1.5	0.5	0.3	1.3	0.5	0.6	0.6
Rock	2.0	0.7	5.0	2.0	0.5	5.5	2.7	2.0	2.0
Sky	7.0	13.0	3.7	9.0	14.0	5.0	9.5	11.0	10.5
Smoke	4.0	4.0	2.0	5.0	5.4	3.5	3.7	5.0	4.4

TABLE V - Concluded.

Percentages of total Rorschach scores for nature items named most frequently.

	Boys			Girls			Total		
	White	Negro	Mountain	White	Negro	Mountain	Boys	Girls	Group
Snow	4.0	0.8	1.6	5.0	1.3	2.0	2.0	2.4	2.2
Sun	1.4	0.7	1.4	1.5	0.5	1.5	1.0	1.0	1.0
Tree	32.0	36.0	32.0	32.0	38.0	32.0	35.0	35.0	35.0
Water	7.6	9.0	5.0	10.0	5.4	7.0	7.8	7.0	7.5

In the Nature category tree is significant not only by the preponderant frequency, but by the equal weight given to it by urban as well as by Mountain children. When the living conditions of these groups are compared, the interest of the Negro children in tree, air, leaf, flower, moon and cloud is worth consideration. The groups as a whole mention most frequently tree, sky, fire, flower, water and cloud. The boys are inclined to emphasize branch, cloud, dirt, fire, leaf, rock and water; the girls to stress flower, moon, sky, smoke and snow.

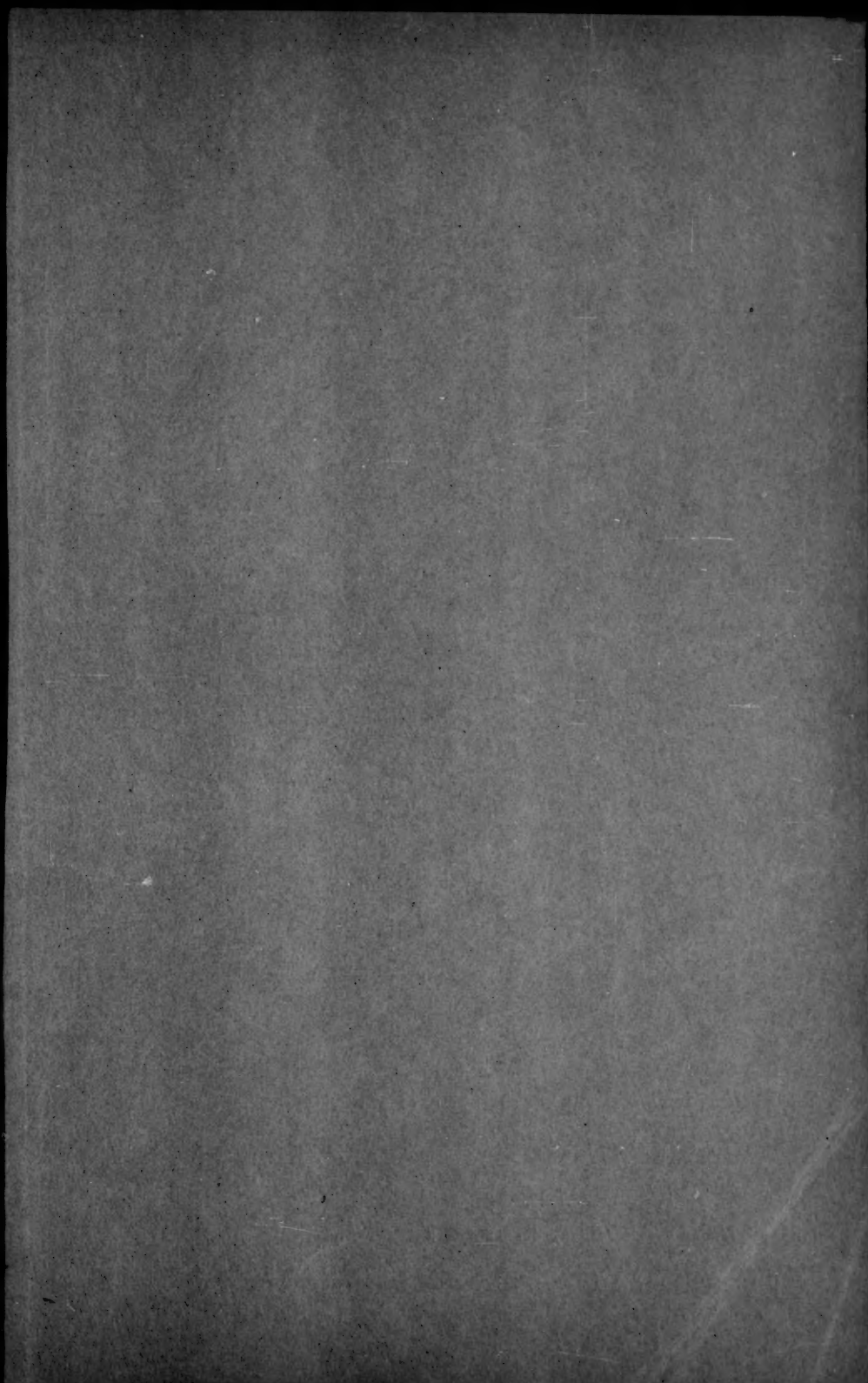
There is general agreement as to the pictures which most readily suggest the various form-perceptions; the few discrepancies may be accounted for by the few responses of that type. Picture I. suggests only flying animals; so does also V. with the exception of horse in the case of younger children. The other animals may appear in any of the other 8 pictures, tho some seem more potent than the rest to suggest specific ones regardless of age and sex. In the nature series, picture I does not suggest rain, grass, ground, and river, nor V. rock, river and sun. On the other hand, all the pictures may suggest cloud, flower, ice, leaf, sky, smoke, tree and water. The pictures especially suggestive of certain animals and phases of nature are listed below.

Bat	I.V.	Air	II.III.VI.VII.	Smoke	IV.VI.VII.
Bear	VIII.	Branch	V.IX.X.	Sun	II.IX.X.
Bee	V.X.	Cloud	II.VII.IX.X.	Tree	IV.VI.VIII.IX.X.
Bird	I.III.V.X.	Dirt	VI.VII.	Water	II.III.VII.VIII.IX.X.
Butterfly	III.V.X.	Fire	II.III.IX.X.		
Cat	III.VI.VIII	Flower	IV.VIII.IX.X.		
Chicken	II.III.	Grass	VII.IX.X.		
Crab	X.	Ground	VIII.IX.X.		
Dog	II.III.VII.	Ice	II.VII.VIII.		
Horse	III.IV.V.	Leaf	I.VI.VII.IX.X.		
Monkey	III.X.	Limb	IX.X.		
Mouse, Rat	VIII.	Moon	VII.IX.X.		
Rabbit	V.X.	Rain	III.VII.IX.		
Snake	III.IV.VI.X.	River	VII.IX.		
Spider	X.	Rock	VII.CIII.IX.		
Squirrel	VIII.	Sky	I.VIII.IX.X.		

For these 3 groups of children, according to the number of individual ideas called forth, pictures X.III.II. suggest the most form-perceptions and I. and V. the least, the other 5 ranging in varying order in between. The totals vary from over 4000 for X. to less than half of that for V. The Negro group find VI. the most stimulating of the middle 5 pictures (instead of VIII. as do the White and Mountain groups) while to the White children this is the least suggestive. The difference in the emotional effect of color, more pronounced in the Negro group, may account for this divergence.

This partial report of results of the Rorschach test has not attempted to describe complete diagnostic performances and the emphasis on a few numerical findings does not imply that statistical procedure gives the final estimate, but without such standards the results of a few limited cases of diagnosis may be over or undervalued, and what is a type pattern may be regarded as unique. For instance, the examiner of these children has been definitely impressed that the mention of rock, stone, cliff and architectural and constructional forms in response to some pictures is indicative of very severe inhibition, but that responses of these terms thruout the series may or may not be such an index. Only further examinations of children characterized by such restraint can bring definite evidence that these or other test elements are the crucial ones. Furthermore, whether the categories in all connections and proportions relative to the others reveal the same psychological processes, whether the categories have the same values for younger children as for adults, whether the personality patterns remain stable from the beginning, these and similar questions can be conclusively answered only by numerous comparisons of children living in different social-racial environments.

- Age, nursery school, 189
 tables for, 115
Attitudes, measurement of, 31
- Behavior, effect of parental education
 on, 255
 interrelations between, 200
 preschool child's, 200
Blame, studies in, 125
Biographies, baby, 71
 bibliography of, 71
Board, measuring, 57
Brain, growth of, 149
- Cabinet, experimental, 183
Children, preschool, 276
Committee for the study of suicide, 76
Concepts, development of, 144
Coordination, motor, 161
Curves, synchronous, 169
- Development, individual, 37
 mental, 1
Drawings, children's, 144
Dreams, childhood, 77
 unpleasant, 77
Drives, development of, 40
 primary, 40
Dutch, age tables for, 115
- Education, differences in, 255
Emotion, studies of, 183
Environment, foster home, 1
- Fears, overcoming of, 6
Failure, studies in, 125
Figures, preferences for, 227
Formulae, interpolation, 149
- Growth, formulae for, 149
- Height, tables for, 115
Home, factors in, 200
 foster, 1
- Indians, age tables for, 115
Infancy, drives in, 40
Infant, proportions of, 60
Instructions, effect of, 276
- Learning, child, 95
- Males, measurements on, 262
Maturity, behavior, 189
Measurements, anthropometric, 262
 reliability of, 262
 serial, 69
Method, biographical, 161
Motivation, studies in, 125
- Norms, Rorschach test, 304
- Parents, differences in, 255
Praise, studies in, 125
Preferences, children's, 227
Proportions, physical, 60
Pupils, thought in, 121
- Recorder, continuous, 169
Resistance, skin, 69
Responses, emotional, 85
 motor, 276
 physiological, 169
 variations in, 85
- Scale, age conversion, 74
Sequences, developmental, 291
Studies, physiological, 183
Success, studies in, 125
Suicide, study of, 76
- Teeth, primary, 273
Test, administration of, 237
 ink-blot, 237
 Rorschach, 237
Thought, modes of, 121
- Weight, tables for, 115
Writing, name, 291
 sequences in, 291



Contents for December

The method of administration of the Rorschach ink-blot test. <i>Marguerite R. Herts</i>	237
The effect of wide differences in the education of parents upon the behavior of their children. <i>Polly Bouck</i>	255
The reliability of anthropometric measurements taken on eight- and nine-year- old white males. <i>Howard V. Meredith</i>	262
Care of primary teeth. <i>R. C. Willett</i>	273
The effect of varying verbal instructions on the motor responses of preschool children. <i>Sue Cook McClure</i>	276
Developmental sequences in name writing. <i>Gertrude Hildreth</i>	291
Rorschach test norms of young children. <i>Dagny Sunne</i>	304

Information for Contributors and Subscribers

Child Development, one of three publications issued by the Society for Research in Child Development, is devoted to brief papers of current research in the child field. The journal is issued quarterly in March, June, September and December, and comprises approximately 400 pages per yearly volume. The subscription price is \$4.00 per year, postpaid. A limited supply of back issues is available at \$1.25 per number. Until the supply is exhausted, complete sets, Volumes 1 to 6 inclusive, may be obtained for \$10.00.

Other publications of the Society include *Child Development Abstracts and Bibliography* and *Monographs of the Society for Research in Child Development*.

Child Development Abstracts and Bibliography, now in its tenth yearly volume, is issued in February, April, June, August, October and December, with separate cumulative subject index for each volume. The subscription price is \$5.00 per year, postpaid.

Monographs of the Society for Research in Child Development, issued irregularly during the year and covering approximately 400 pages, consist primarily of detailed critical reviews and seriatim studies. The subscription price is \$4.00 per yearly volume.

The three publications of the Society are available at the special price of \$10.00 per year.

Correspondence relating to articles and papers for publication in *Child Development* should be sent to Dr. Buford Johnson, Psychology Department, The Johns Hopkins University, Homewood, Baltimore, Maryland.

Correspondence relating to studies for publication in the *Monograph Series* should be sent to Dr. John E. Anderson, University of Minnesota, Institute of Child Welfare, Minneapolis, Minnesota.

Correspondence relating to subscriptions and business matters for all publications should be sent to the Editorial Office, Society for Research in Child Development, National Research Council, 2101 Constitution Avenue, Washington, D. C.

C51

0E2E 0
1328
2E32
3235
4238
5235
63E8 7528

0E2E 0
1328
2E32
3235
4238
5235
63E8 7528